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GOROKE CROP AND FALLOW COMPETITION. 1918.

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General Impressions.

The Goroke district is decidedly out of the ordinary as regards soil types and rainfall, and in its agriculture may be said to be still in the pioneering stage.

The efforts of the Society to promote interest in and investigation into local agricultural problems, such as wheat-growing, are, therefore, worthy of the whole-hearted support, not only of the farmers of the district, but also of those interested in the large tracts of similar country in the west of Victoria.

To achieve the best results, it is necessary for the investigations to be continued from year to year, and for the competitors to look further ahead than the prize; the mere pot-hunting spirit cannot be too strongly deprecated.

The success of the competition depends largely on the interest and co-operation of the competitors. Just to that degree in which they preserve an open mind, keep accurate records of the various farming operations, and enter the competition, not so much to win a prize as to test a particular style of farming, so will they derive benefit.

The scattered nature of the exhibits, the variable soil types, and the failure of some of the competitors who exhibited fallow last year to show the crop grown on that fallow, are points which have limited the value of comparisons of methods and results. The number of cases of a particular sort was thus too limited to enable accurate generalizations to be made.

The difficulties which beset this class of work in a district such as Goroke, and the reasons why actual experimental tests must be made the

final test, are best understood by a consideration of the soils and the annual rainfall.

THE RAINFALL.

The average rainfall at Goroke for a period of eighteen years is 20.36 inches—an amount which, for wheat on ordinary soils, if rightly distributed, is usually considered satisfactory. When, however, the average monthly distribution is examined, it is found that 16.87 inches fall in the period April to November inclusive, *i.e.*, over $3\frac{1}{2}$ inches greater than that received for a similar period at Nhill, in the Wimmera. The April and May precipitation is similar in both places, but between 2 and 3 inches a month are received at Goroke in the period June to October, which is, roughly, an inch a month heavier than at Nhill. On reasonably porous soils this would be ideal; at Goroke it is often an embarrassment. A comparison of the average rainfall at the following centres, *viz.*: Goroke, Rutherglen, and Nhill, shows that there is a close resemblance between the monthly precipitation of the two first-mentioned places. On similar classes of soils, the results of successful experience at Rutherglen might be worth considering at Goroke.

TABLE SHOWING AVERAGE YEARLY DISTRIBUTION OF RAINFALL FOR
GOROKE, RUTHERGLEN, AND NHILL.

		Goroke, Points.	Rutherglen, Points.	Nhill, Points.
April .. ..	..	158	120	139
May .. ..	..	174	194	160
June .. ..	..	302	295	234
July .. ..	..	222	228	154
August .. ..	..	204	196	173
September ..	..	282	200	187
October .. ..	..	193	189	177
November ..	..	148	145	98
Total for 8 months		16.83 in.	15.67 in.	13.22 in.

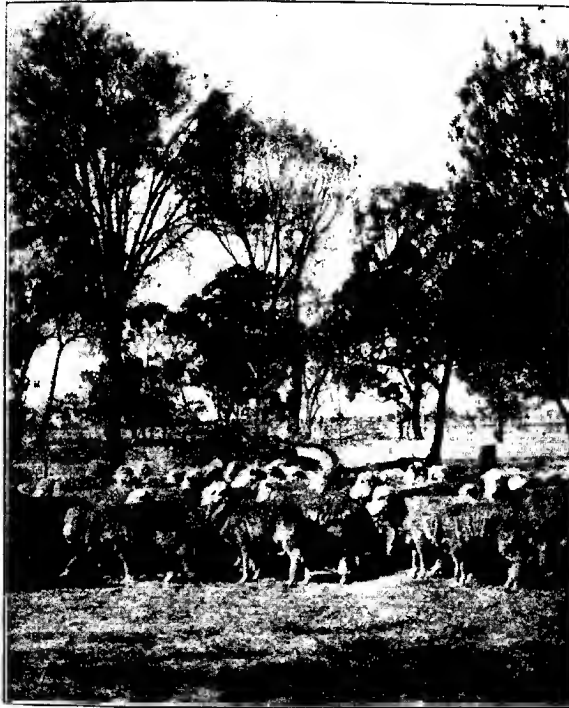
THE SOILS.

The soil types are most varied. The prevailing type is a light silty loam overlying a yellow clay subsoil, and frequently there is a cementy layer of buckshot in between. There are, however, considerable, though scattered, areas of heavier and very fertile soils. Some of these, as at Minimag, resemble the black soils of the Wimmera plains; others, again, consist of a heavy, though generally friable, clay. This latter country is usually crab-hole. There are also rich hummocks of black sandy loam bordering the numerous lakes, while in the vicinity of the sandy desert, or of isolated sand-hills, free working sandy soils, overlying clay, are often met with. As it is quite a common thing for a 50-acre paddock to contain several of these types, the difficulty of making fair comparisons will be obvious.

Each class of soil has its peculiarities. The light silty loams, when cultivated, tend to puddle down, and on drying set like cement, a condition which is fatal to germinating grain and detrimental to the healthy

growth of a more mature plant. These soils are markedly deficient in organic matter and in phosphoric acid. On them the growing of wheat is treated as a catch crop, and often the ultimate aim is just grass improvement. The land is cleared, ploughed, left fallow till seed time, and sown to wheat or oats. Perhaps two crops are obtained in this way before the paddock is allowed to rest in grass for an indefinite period.

The sandy soils referred to as occurring adjacent to sand-hills do not puddle down like the silty soils, but in a wet year may become water-



Typical Goroke Country.

logged because of the impervious nature of the clay subsoil. In a dry year the crops "hang out" over long stretches. The rich sand hummocks are easily worked, and are capable of growing splendid crops.

The heavy clay soils are somewhat difficult to manage until they become levelled with cultivation. They will stand frequent cropping, and do not puddle as does the silty type. Under present methods soils of the heavy class, and those related to them, are apt to become very foul with wild oats and thistles.

DEDUCTIONS THAT CAN BE MADE BY A CONSIDERATION OF LOCAL
PECULIARITIES.

The differences of opinion that exist among farmers in the district as to the best way of growing a crop of wheat on the various soils were referred to last year. The methods of the successful entrants of this year's competition do not throw a great deal of light on the subject, for the reasons already mentioned. Until further local experience, or,



One of the numerous lakes.



One of the rich sand hummocks.

better still, actual field tests, demonstrate in each case which are the best methods, we are forced to regard as correct those local farming practices which satisfy such general principles as can be deduced from a consideration of the special soil and climatic features of the district. Any method that might thus suggest itself must, of course, take into account the fact that wool-growing is at present the chief industry of the district

WHEAT-GROWING ON THE SILTY SOILS.

It has already been remarked that on the silty soils the effect of the puddling is serious alike to germination and growth. Puddling is accentuated by frequent cultivation, and it, therefore, follows that this working should be reduced to a minimum; but it is quite possible that to do away with it altogether, as is the general tendency at present, has other disadvantages. Two that may be mentioned arise primarily from the complete lack of moisture in the fallow during the summer months, which the present practice has been proved to bring about. The first of the two is that, in the absence of water, certain vital soil functions, such as nitrate formation, do not proceed, and the second is that the seeding time is then necessarily dependent on the incidence of the autumn rainfall, which is generally light and uncertain. Dry sowing is to be deprecated on these soils, as a heavy rain after seeding will set the loose soil down like a cement, and the grain is, perhaps, partially or totally destroyed.

From these considerations, in the absence of practical tests, it would appear that possibly at least two cultivations should be given at two critical periods during the year, preferably with an implement that will leave as nubby a surface as possible. The conservation of a reasonable amount of moisture would permit of advantage being taken of mid-April rains, even though light, to sow the crop with the certainty that it would continue to do well. On these soils it might be well to use the cultivator-drill, in this way doing away with one cultural operation, and, therefore, avoiding unnecessary pulverizing of the ground. If late maturing varieties of wheat, such as Yandilla King and Penny, are sown thus early, there is a much better chance of their resisting the usual wet winter experienced, and, further, of the young crop actually reducing the puddling which is largely brought about by the beating action of the rain on the bare soil. The effect of a young crop in sheltering the surface is considerable. Furthermore, a crop well established is much better able to resist excessive wet than germinating grain. Mid-April sowing is most successful at Rutherglen.

If the crop becomes too forward, as is likely in a favorable year, it may be eaten off. In other years this would not be necessary. Seeing that the packed surface is so deleterious to the growing crop, a good harrowing of the crop after it is well up should prove an advantage. This practice on a somewhat similar, though heavier, soil at Rutherglen Experiment Station has proved payable.

On such land, seeing that the germination is likely to be low, heavier dressings of seed than are usual in the wheat districts will probably prove profitable. Possibly 60 lbs. would be the best amount with which to start the April sowing, progressively increasing the quantity up to 1½ bushels to the acre as the season advances.

It seems to be pretty well established that dressings of superphosphate, in the vicinity of 1 cwt. to the acre, are the most payable on this class of soil. The residual effect of these heavy dressings of manure on the grass is most important.

It should be noted that a deficiency of organic matter in the soil is the root of the whole trouble. Any well-thought-out system of farming will aim at gradually relieving that. Wheat stubbles should be

incorporated whenever possible; the same object will be served, and sheep feed provided, by the sowing of such forages as *Melilotus* with the last cereal crop prior to leaving the paddock out.

WHEAT-GROWING ON THE HEAVIER SOILS.

On the heavier soils the problems are of a different nature. As a result of present methods, wild oats and other weeds rapidly obtain a hold on the best land. Serious losses from this cause occur annually. They may be prevented by adopting methods in the treatment of the fallow that will encourage the weeds to germinate, and thus facilitate their removal. Little or no germination of rubbish will take place on a rough, dry fallow.

On the heavy soils the sowing of wheat should, therefore, be deferred until the autumn rains have caused a satisfactory germination of the weeds, which may then be removed by cultivation.



Lamb-marking Time at "Mortat."

(The production of merino wool is Goroke's stable industry.)

There is no doubt that this soil will stand, and should get a good working after summer rains, with the object of conserving water and of maintaining a satisfactory tilth. The mulch should be, if possible, at least $2\frac{1}{2}$ inches deep. Where crab-holes interfere with the management of the paddock, it will probably pay to replace the harrows on one occasion each year with a grader, thus gradually levelling the paddock.

THE PROVISION OF SHEEP FEED.

Seeing that the ultimate object of much of the cultivation carried out at Goroke is sheep feed, the present method of depending wholly on grass that may chance to take root in the stubbles is one that it may be possible to improve upon. Successful attempts have been made in the Wimmera and elsewhere in the wheat belt in laying down temporary pastures by sowing a few pounds of grass or other seed with the preceding cereal crop.

Reference was made to these practices in a recent report to the Nhill Agricultural and Pastoral Society. *Melilotus parviflora*, the King Island Melilot, was one of the plants referred to. Isolated specimens were noticed in some of the crops on the heavy soils at Goroke, showing that the plant will grow there.

If it can be grown on the lighter soils, it would furnish a valuable means of increasing their fertility, and, at the same time, provide useful grazing. It is possible that it may pay to sow a few pounds of rye-grass in a similar manner. Particularly is that variety of rye-grass, recently tentatively identified as *Lolium subulatum*, worth a trial, though it should be closely watched and checked if it spreads.

SUGGESTIONS.

Notwithstanding the desirability of improving the present methods of cultivation, wool growing is likely to remain the main consideration in the lighter soils of the Goroke country—on these soils sheep feed is the ultimate aim of most of the cultivation. It would seem, therefore, that the future advancement of the district is largely bound up in such improvements as can be effected in the present pastures. That being so, in addition to the stimulation of interest in the cultivation of wheat, the Society would be well repaid by directing some of its efforts towards encouraging farmers to test any methods of grass improvement that seem feasible. Some of these methods have already been mentioned. Another is the top-dressing of the natural pasture with superphosphate. The success of this practice has been demonstrated at the Rutherglen Experiment Farm, where, under somewhat similar conditions, annual dressings of $\frac{1}{2}$ cwt. of superphosphate have been shown to double the carrying capacity of virgin land.

Results, Crop and Fallow Competitions, 1918.

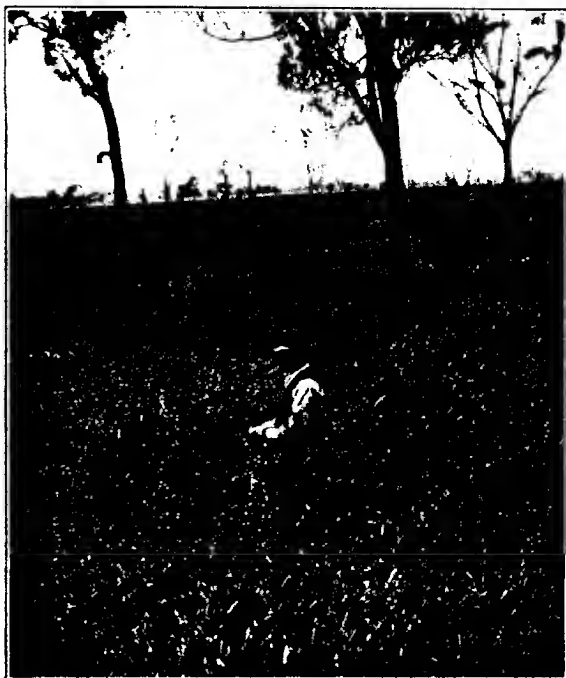
I.—BEST FIFTY ACRES OF CROP ON HEAVY SOIL.

The heavy winter rainfall rendered the whole of the crops very uneven. It was, therefore, difficult to gauge the yields accurately; but as all competitors suffered the same disability in this respect, it is probable that the comparisons made are reasonably fair:—

Name.	Soil.	Apparent Yield.	Type.	Disease.	Weeds.	Evenness.	Total.
	Possible Points	35	20	15	15	15	100
A. J. Lees ..	Black	26	18	7	13	11	75
H. C. Block ..	Black	20	19	11	13	10	73
N. Tully ..	Light black bank ..	19	16	13	11	11	70
H. Perry ..	Strong crab-hole ground, with black bank	20	7	13	10	9	69
J. Delaney ..	Mixture of black and red clay loam	20	18	14	6	11	69
F. O. Robertson	Mixture of black and red clay loam	20	18	14	5	11	68
J. Molloy ..	Mostly black loam, but patches of red loam	8	13	7	5	5	38

COMMENTS.

The winning crop was of the Penny variety, and was sown on a very fertile bank of friable black loam. The seeding was made in May at the rate of one bushel to the acre, with 60 lbs. of superphosphate. This crop was not grown on fallow. The stubbles of the preceding wheat crop were burnt, and the land disked in January. Subsequently it was scarified in March, and harrowed. The bank is evidently very rich to stand this treatment. The crop was tall and clean. There was evidence of takeall.



Crop of Penny Wheat on heavy clay soil at Mr. C. D. Block's.

The crop exhibited by Mr. H. C. Block consisted of two varieties—Penny and Federation. Both were very true to type. The yield of the crop was materially decreased by the presence of crab-holes. The paddock had been out to grass for five or six years. It was fallowed in September, during the summer it was spring-toothed twice, and once again before the drill. It was drilled on 1st June with 49 lbs. of seed and 60 lbs. super. It was fed off to sheep. The crop was on the thin side.

Mr. Tully showed the varieties, Federation, Ponny, and Major. With the exception of Major, these were good samples. The fallow

had received no working other than at ploughing and seeding time. It was, however, new ground, and a heavy black bank at the lower end contributed largely to the yield. The 50 acres shown were not grown on the same 50 acres exhibited as fallow last year. The crop was eaten off with sheep. No particulars of rate of seeding or manure used are available.

Mr. H. Perry's crop of Federation was grown partly on heavy crab-hole ground, and partly on a rich black friable bank. It was virgin ground, and had been worked well. The crab-holes caused a serious loss in the yield; but the crop was exceedingly heavy on the bank, and this contributed largely to the total yield. The crop was sown from 23rd April to the second week in June, the black bank being sown last. A bushel of seed was sown, with 100 lbs. superphosphate.

The crops of Messrs. Delaney and Robertson were sown with a combined cultivator and drill—24th May to 24th June. Penny and Federation were the varieties. Sixty pounds of seed were used, and 90 lbs.



Heavy crop of Algerian oats on a sand hummock at Mr. Lees'.

super. The working given was as follows:—Ploughed, August and September; harrowed and cultivated before harvest. Fields were spring-toothed in February, and prior to seeding were again spring-toothed.

Both of these crops were very foul with wild oats, a fact which caused them to be rank and somewhat spindly, and will materially detract from what would have otherwise been high yields.

II.—BEST FIFTY ACRES OF CROP ON LIGHT SOIL.

Name	Soil.	Apparent Yield.	Type.	Disease.	Weeds.	Evenness.	Total.
	Possible Points ..	35	20	15	15	15	100
T. Ough ..	Light sandy loam ..	21	10	11	11	12	65
Caldow Bros. ..	patches heavier Light sandy loam ..	6	18	11	12	7	54

Mr. Ough showed a crop of Federation wheat. It was sown just after a heavy fall of rain in April. Forty-five pounds of seed and 50 lbs. superphosphate are stated to have been used. The Federation wheat was badly mixed with strangers. The land was virgin soil, and was merely ploughed during the previous September and left rough during the summer until worked up just prior to seeding. The result was a typical instance of what can be done on this class of soil with a minimum of working when the seed is sown at the right time. The crop was lightly fed off, and was somewhat on the thin side, as might be expected from the light seeding.

It is easy to understand what instructive results could have been gleaned from this paddock were it an experiment field, when portion could be worked once or twice after rain during the summer, and some of it sown a month later than was actually the case, and the various results compared.

Messrs. Caldwell's crop was Purple Straw. This was sown on the 1st May, mostly dry, with 70 lbs. of manure. The germination must have been very poor, as the crop was exceedingly thin.

The fallow on which it was grown was ploughed in July. Subsequently half of it was scarified in spring, and the other half scarified just before cropping, the whole being harrowed just before seeding.

III.—BEST FIFTY ACRES OF CROP GROWN ON 1917 FALLOW, HEAVY SOIL.

Name.	Soil.	Yield.	Type.	Disease.	Weeds.	Evenness.	Crop Total.	Proportional Points—Crop (1917 basis).	1917 Fallow Total.	Grand Total.
	Possible Points	35	20	15	15	15	100	200	200	400
J. Delaney ..	Mixture of black and red clay loam	19	18	14	6	11	68	136	171	307
F. O. Robertson	Mixture of black and red clay loam	19	18	14	5	11	67	134	161	295
C. D. Block ..	Crabholey, yellow clay, sets down	18	18	14	14	11	75	150	111	261
C. Walker ..	Crabholey, yellow clay	10	16	10	8	8	52	104	67	171

The exhibits of Messrs. F. O. Robertson and J. Delaney have already been discussed.

Mr. C. D. Block showed a crop of Penny, which was true to type, clean, and practically free from weeds. It was, however, thin, and crab-holes were responsible for considerable loss. The paddock, which was virgin soil, was ploughed in July and August and spring-toothed in November and December. When seen in March there was a good tilth. It was not again worked until just prior to seeding. The crop was drilled during the last week in May. Heavy rain fell on 1st June, and

continued. Fifty-two pounds of seed was sown with 100 lbs. super-phosphate.

The yield of Mr. C. Walters' crop of Purple Straw had been greatly reduced by crab-holes. The fallow, which was new ground, had been treated as follows:—It was ploughed in August, September, and October, and then harrowed. Considerable difficulty was experienced in carrying out these operations as a result of the crab-holes. When seen last March it had set hard, and the harrows had just scratched the surface. Subsequently, prior to seeding, it was disked, spring-toothed, and harrowed. The paddock was sown mid-May to June with $1\frac{1}{2}$ bushels of seed and 93 lbs. of manure to the acre, and was harrowed after seeding. The portion of the crop sown earliest was the better.



Comfortable homestead at Goroke.

IV.—BEST FIFTY ACRES OF CROP GROWN ON 1917 FALLOW,
LIGHT SOIL.

Name.	Soil.	Yield.	Type.	Disease.	Weeds.	Excess.	Crop Total.	Proportional Points—Crop (1917 basis)	1917 Fallow Total.	Grand Total.
	Possible Points ..	35	20	15	15	15	100	200	200	400
G. Patching ..	Light — patches heavier	12	17	10	11	10	60	120	150	270
J. Burton ..	Light sand over clay, no buckshot	18	14	11	10	13	66	132	137	269
T. Ough ..	Light sandy loam patches heavier	21	10	11	11	12	65	130	70	200

The following, who exhibited fallow last year, did not compete:—M. Kiely, C. D. Block, J. Cameron, A. Richards.

Mr. Patching's crop of Federation had been sown on old ground, portion of which was somewhat low-lying. The fallow had been treated as follows:—Ploughed in July and August, it was spring-toothed in October and again in February. The paddock was sown dry on the 15th April, just before a fall of $1\frac{1}{2}$ inches of rain. Portion, which came up before the rain, eventually died out. One and a quarter bushels of seed were sown, together with 112 lbs. of manure. The crop had been greatly thinned out in patches by water. The type of seed was good. Wild oats and drake were present, and take-all was noticed.

Mr. J. Burton's crop of Federation was sown on new fallowed ground, which had been treated as follows:—Ploughed in May with Shearer stump-jump; in October it was spring-toothed. It received no additional working except a harrowing before and after the drill. Seed at the rate of $1\frac{1}{2}$ bushels to the acre was sown on 6th May after 2 inches of rain. Further heavy rains followed two days after seeding was completed, and this probably accounts for the relative thinness of the crop, notwithstanding the heavy seeding. One hundred pounds of superphosphate was used. The sample of Federation was mixed. Some drake was present in the crop, but no wild oats.

Mr. T. Ough's crop and methods have been previously discussed. As compared with Mr. Burton's crop, it strikingly demonstrates the value of April sowing.

Fallows.

Heavy Soils.

I.—HIGHEST AGGREGATE OBTAINED BY ADDING THE POINTS OBTAINED FROM FIFTY ACRES OF FALLOW (1918) TO THOSE FOR THE CROP (1919) GROWN ON THAT FALLOW.

Name.	Soil	Moisture	Mulch.	Weeds.	Tillage.	Total.
	Possible Points	25	25	25	25	100
W. G. Burns ..	Mixed black and yellow loam	20	18	25	20	83
S. Cross ..	Black flat ..	14	19	22	22	77
J. Delaney ..	Mixed black and yellow clay loam, lighter patches	14	17	23	21	75
J. Molloy ..	Rich bank, mixed black and yellow loam	22	16	21	15	74
J. Cummins ..	Mixed black and yellow clay loam	12	16	18	19	65
M. Lees ..	Yellow clay loam ..	10	..	21	12	43

Mr. Burns' fallow was on a good heavy bank. It showed plenty of moisture, and was fairly well mulched, though this was on the rough

side and somewhat too shallow. There was a complete absence of weeds. The paddock was ploughed about the middle of September, and subsequently cultivated with a spring-toothed cultivator.

Mr. S. Cross exhibited a splendid black flat, which is occasionally subject to inundation. It was deficient in moisture as a result of a late mulching. An excellent mulch had, however, recently been placed on it. The paddock was ploughed in October, spring-toothed in November, and then harrowed.

Mr. J. Delaney's fallow, which showed many crab-holes, had a good surface, but the mulch was too thin and patchy to be properly effective. The paddock was ploughed, spring-toothed, and then disk-cultivated.

The paddock exhibited by Mr. J. Molloy was the same as that shown last year. Mr. Molloy was unable to get it broken down in time to sow. It was ploughed in the winter of 1917, and then left rough. It was re-ploughed in October, 1918. Subsequently it grew a great quantity of trefoil and weeds, which were turned under with a Shearer cultivating scarifier just prior to the inspection. The soil showed the highest moisture content of any, as might be expected, but it wants further working down to effect consolidation, break clods, and establish an effective mulch. The soil appears to be very rich.

Mr. Cummins' fallow was deficient in moisture, having been mulched rather late. The paddock was ploughed in August and September, and then harrowed, and was disked in November.

The paddock shown by Mr. Lees had merely been ploughed. It was very deficient in moisture, and there was no loose soil on top.

Light Soils.

II.—FOR THE HIGHEST AGGREGATE OBTAINED BY ADDING THE POINTS OBTAINED FOR FIFTY ACRES OF FALLOW (1918) TO THOSE FOR THE CROP (1919) GROWN ON THAT FALLOW.

Name.	Soil.	Moisture.	Mulch.	Weeds.	Tillage.	Total.
	Possible Points	25	25	25	25	100
M. Lowe ..	Light loamy paddock near desert, over buckshot and clay	8	24	25	20	77
F. O. Robertson	Light silty soil over buckshot and cement over clay	8	23	24	18	73
E. Cross ..	Loose sand over clay near desert	10	20	25	18	71
C. D. Block ..	Silty soil overlying clay or buckshot	7	18	20	16	61
Caldow Bros.	Rather heavier soil than the above	7	..	23	14	44

Considerable difficulty is experienced in comparing on a fair basis each of the fallows on these varying soil types. For instance, the exhibit of Mr. E. Cross was close to a sand-hill, and was a loose sand overlying

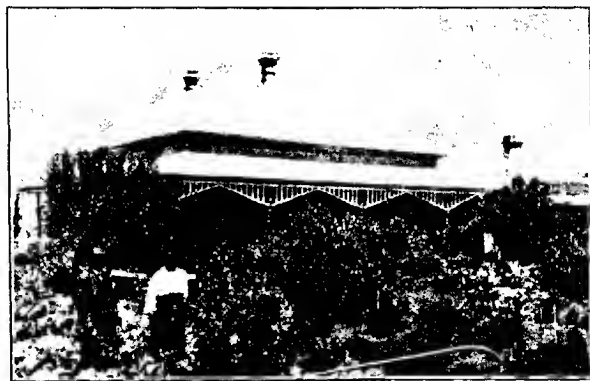
a very retentive clay subsoil. The appearance of such a fallow might be highly satisfactory, yet it is obvious that in a wet year, through water-logging, the crop might become a total failure.

It was decided not to take the type of soil or its previous history into account. The effect of these will be evident in the crop next year, and, consequently, be indicated in the final points.

Mr. Lowe's paddock showed a fair moisture content, and was nicely mulched. It had been ploughed in September, and subsequently spring-toothed.

The mulch on Mr. F. O. Robertson's exhibit was deep, but rather on the fine side. The fallow had been disk-ploughed in March, subsequently spring-toothed, and then disk-cultivated.

Mr. E. Cross' paddock was ploughed in September, then harrowed and left. The clay subsoil was very moist. The paddock had been



This garden, like others in the district, is situated on a sand hill, and is irrigated from an adjacent lake.

cropped several times previously in what chanced to be wet years. Comparative failure resulted.

The mulch on Mr. Block's fallow was too rough, and there was a heavy skin. Weeds were present. The ploughing was done in August; in September it was spring-toothed. It was intended to work the paddock again, but shearing intervened.

Messrs. Caldw Bros. had merely ploughed the block and left it.

In conclusion, I have to thank the President, Mr. F. O. Robertson, and the Secretary, Mr. Vorweg, for the arrangements which facilitated the work of judging, and also those farmers and others whose homesteads were visited, for their hospitality.

Most of the competitors were present at the judging this year, and all of them showed a praiseworthy spirit of co-operation in answering questions.

PEAR GROWING IN VICTORIA.

(Continued from page 86.)

*By E. Wallis, Orchard Supervisor.***Apple and Pear Growing in Root Borer Infested Ground.**

In plate No. 10 there is shown a Jonathan apple tree on the left, bearing some fruit near tops of leaders. These have been cut hard, as they were showing signs of dying back owing to root borer. The next tree is a Williams pear tree, and although growing under the same conditions, shows no sign of die-back—in fact, it appears to be doing well.



Plate No. 10.—Pear Tree in a Greensborough Orchard which is growing vigorously, though an apple tree within a few yards is stunted and dying at the top.

This is typical of many instances where rows of pear trees are apparently unaffected whilst the apple trees on either side of them are dying out as a result of the ravages of this pest.

These facts are not mentioned to encourage the growing of pears under adverse conditions, but rather to show by way of contrast the hardy nature of the pear as compared with the apple and other fruits. The pear like all other fruits requires the most favorable general conditions if good results are desired. The knowledge of the pear tree's comparative immunity from one of the worst orchard pests should, however, be borne in mind by prospective planters in soils possibly favorable to the root borer.

Although not immune from the effects of frost, the pear, when compared with other early-blooming fruits, is far more resistant. The frost

of 15th October, 1915, will long be remembered as one of the most severe frost visitations ever experienced in this State—the greater part of the fruit crop, including apples, being destroyed. In many cases, however, the pear, even when growing on low situations, resisted the frost fairly well, and the fruit, though frosted and the pips destroyed, developed and attained a very fair size.

Plate No. 11 shows pears curiously distorted owing to the frost referred to.

In the specimen shown in plate No. 12 will be noticed distinct rings of russet caused by frost, which is rather common after a severe frost, and is known as frost-ring.

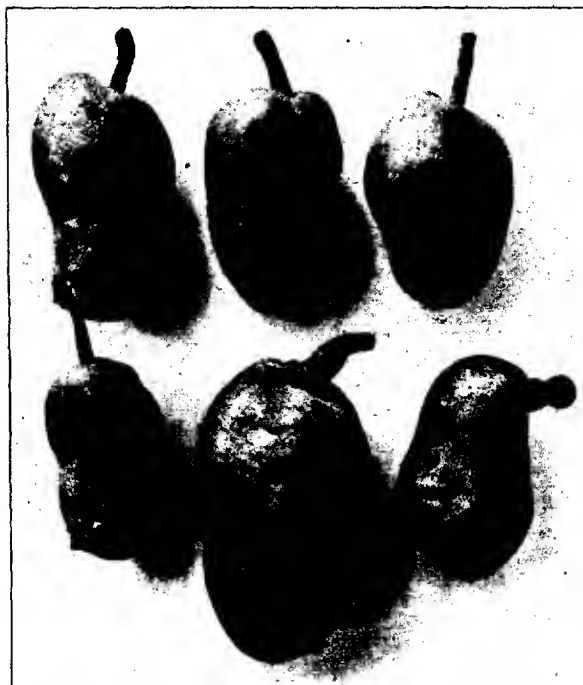


Plate No. 11.—Pears, distorted and pipless, as the result of frost.

Yields of Pear Trees.

Owing to the natural hardiness of the pear tree and its resistance to adverse growing and fruit-setting conditions, one would naturally expect the average crops over a number of seasons to be larger than from other fruits of a less hardy nature. Such expectations are borne out by the reported yield of pear trees compared with that of apple trees during years 1910-11 and 1913-14. In the former season the

yield of pear trees in Victoria was estimated at 1.76 bushels per tree, and in the latter at 1.07, an average crop of 1.415 bushels per tree, as against an average yield from the apples during these seasons of 1.09 bushels, a difference of .325 bushels per tree in favour of the pear.

It is found by referring to data of pear yields in other States, and also in America, that the average yield per tree in these places does not compare favorably with those of Victoria. In the writer's opinion, this is due not only to the suitability of climate, &c., in this State, but also to the adaptation of scientific methods in pruning, cross-fertilization, spraying, &c., as advocated by the Orchard Supervision Branch of the Victorian Department of Agriculture.

Soil and Situation for Best Results.

Experience is always a good guide, but especially so in the many complex details of orchard work. When orchards were first established in this State, the pioneers had no data to guide them in the work of planting. Thus indiscriminate planting in regard to varieties, suitable

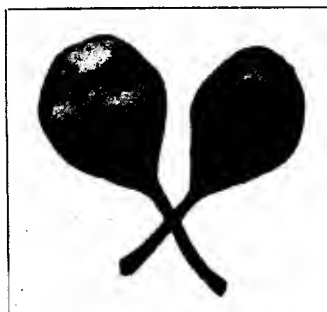


Plate No. 12.—Pears affected with frost ring.

soil, and situation, was the rule. Many old-established orchards bear witness to this fact by the pear trees being located in soil more suited to other kinds of fruit and *vice versa*.

With varieties it did not appear to matter much in the early days of fruit-growing in this State how many were planted, for it seems that the growers who planted the greatest number succeeded best in the business. It is, however, different in these days, when the grower has to move with the times, and instead of planting large numbers of varieties has to confine his attention to a few which are most profitable according to the markets he intends to supply. In the choice of situations and soil conditions most suitable for pear trees there has been much to learn; but the acquirement of this knowledge has been facilitated by the mistakes made in original plantings. Although the pear is fairly cosmopolitan in its soil requirements, it is necessary to give due consideration to those conditions under which this fruit will produce the best results, even to the studying of the likes and dislikes of a particular variety.

Fortunately it often happens that, in choosing the best location for the pear in an orchard of mixed fruits where the soil differs in quality, soil is selected which would not be at all suitable for such trees as the apple; in fact, may even prove fatal to their existence in a few years. Thus by such systematic planting we not only provide the conditions best suited to the needs of the pear, but also for the other kinds of fruit to be planted. Of course, if the orchard is to be established in a locality where the soil is of a uniform quality and the surface fairly level, no discrimination in the choice of soil or situation will be possible, but in undulating country the soil conditions often vary considerably, even in an area only a few acres in extent.

This difference in land is usually very marked in country of a silurian character, where on hillsides the soil is generally of a shaly nature, poor in quality and lacking in humus, but as a rule on a southerly exposure the soil is deeper and contains more humus than on northerly aspects, exposed to the drying effects of north winds.

On the flats adjoining these hills the soil is generally of a heavy alluvial character, fairly deep and rich in humus owing to the washings and decay of organic matter from the hillsides.

As far as soil conditions only are concerned this heavy alluvial ground or even any heavy soil except that of a basaltic nature is suitable for pear-growing. In fact if the area to be planted with mixed fruits is of varying quality, the hardest soil, which would probably be quite unsuitable for such trees as the apple, may be selected as the situation for pears, the other fruits being placed in the more friable soil. Probably the pear will do well, even under such conditions, and the less hardy fruits, by being placed in the more kindly soil, will be enabled to produce maximum results which would not be at all possible if the positions were reversed.

There are, however, certain limitations to the planting of the whole area of pears in such situations on low-lying ground. The old maxim against putting all our eggs in one basket is to be borne in mind. It is now recognised that the majority of varieties of pears is subject to attack from the parasitic fungus known as pear scab if planted in low-lying and protected situations, but if the same varieties are planted in high exposed positions, they are to some extent guaranteed immunity from this disease. There are varieties which are not, as a rule, badly affected with this fungus, even when planted in positions unfavorable to other pears. Amongst the varieties which enjoy comparative freedom from attack are Kieffer (and all the sand pear type), Howell, Broom-park, Winter Cole, Winter Nelis, and Black Achan. Such knowledge should prove of value in assisting the planter to place his varieties in the most favorable situations.

Another factor to be considered is the influence of soil conditions upon the fertility of pear trees. In the case of Kieffer, for instance, if this variety be planted in deep rich soil the tendency is to promote excessive growth at the expense of the fruitfulness of the tree. This may to some extent explain the old adage, "Plant pears for your heirs," as it is easy to understand that without the aid of modern scientific treatment of trees in regard to cross-fertilization and pruning such trees may remain unproductive for many years. The planting of a strong-growing variety in poor soil has a steadying effect upon the

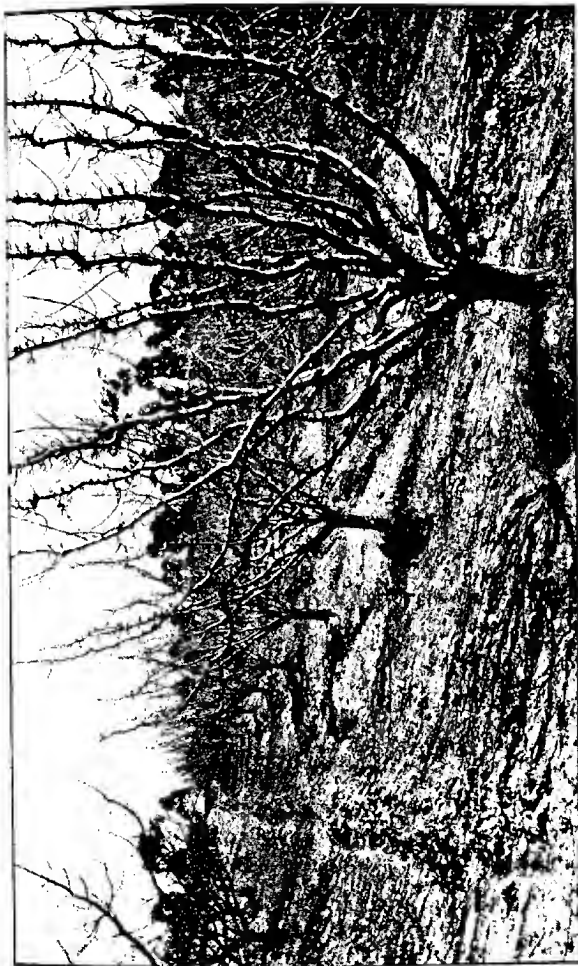


Plate No. 13.—Row of Winter Nails Pear Trees.

(Two end trees (on good soil) bear well, and trees on hill on poorer ground also yield well.)

growth of tree, thus promoting its early fruitfulness. This is varietal and not a general characteristic, for other varieties, such as Winter Nelis, require the deep rich soil in order to do their best. In the rich soil of Bacchus Marsh flats this variety, usually a shy bearer, bears heavy crops of large-sized fruit.

Plate No. 13 shows a row of this variety at Diamond Creek, running down a hillside of poor shaly soil to a flat of heavy, deep, rich alluvial soil, in which a few trees only are situated. The trees in the good soil fruit well, but those in the poorer soil yield only very poor crops.

The remarks already made apply chiefly to fruit-growing districts of a silurian nature, but owing to the adaptability of the pear to varied conditions of soil, &c., the grower in a locality where the soil is of granitic origin or is of a loamy nature will find his trees do well under such conditions. The pear tree will also adapt itself to almost any of the climatic conditions of our State, whether it be those of the hot inland irrigation districts or the cool mountainous or humid coastal conditions.



Plate No. 14.—A Victorian Cool Store.

Of course, the northern districts have a distinct advantage over the southern parts of the State in regard to time of ripening of early varieties, such as Williams Bon Chretien, which is generally placed on the Melbourne market three weeks before those from the southern district are ready. Thus high prices are obtained before the bulk of the crops of this variety has ripened. This aspect of pear-growing should commend itself to growers in northern districts, and even earlier varieties, such as Clapp's Favourite, might be grown with advantage.

Locality and Marketing Facilities.

There are many ideal sites for pear growing in Victoria combining both perfect soil and aspect conditions, but, owing to their geographical situation, they are not suitable for commercial fruit growing. It is recognised more each year that the difficulties of transporting fruit to market, both over long distance and hilly roads, means increased cost of production, and, in addition, the grower is handicapped in placing his fruit on the market in perfect condition—two important factors creating profit leakage.

It is therefore essential, in order to be successful in the business of commercial pear growing, for the prospective grower to choose a locality

or his orchard as near as possible to a local market; if far removed from the metropolis, it should be within reasonable distance of a direct railway line to Melbourne or the capitals of the other States, thus enabling the fruit intended for Melbourne market, Inter-State, or overseas trade, to be transported without any unnecessary difficulty.

As a rule, the main orcharding districts of Victoria are so situated, and, by choosing one of these for pear growing, the grower who is new to the business will have the advantage of the experience of established growers in many phases of the work.

The addition also of a cool store adjacent or within a reasonable distance of the orchard, is a great acquisition to any fruit-growing centre, as it enables the grower to place his pears in the store in a fresh and sound condition—an essential for the successful storage of fruit, particularly pears. If the store be so remote from the orchard as to necessitate transportation by rail, there is great risk of the pears being damaged in transit, and be the cause of their failing to keep well after being placed in the cool store.



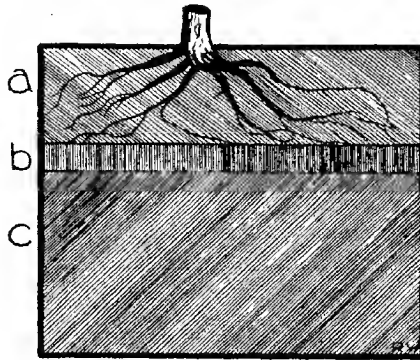
Plate No. 15.—Unloading Fruit at Cool Store.

Preparation of Land for Planting.

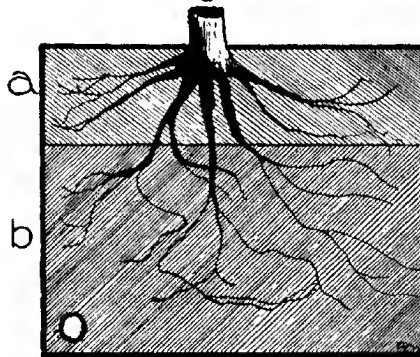
Clearing the Land.—Clearing the land of native timber is done by ring-barking trees, allowing them to die, and then grubbing them root and stump from the ground. Sometimes the timber is removed from the land whilst in its green state, but as this method impoverishes the soil, the former method should, where possible, be adopted. Whatever way the clearing is done, great care needs to be exercised in the removal of all native roots from soil, as these are the natural host of the root fungus (*Armillaria mellea*) which, if not destroyed, quickly establishes itself on young fruit trees to their immediate detriment and subsequent death.

Soil and Subsoil Preparation.—The surface soil may be rich in all the essential food requirements for the welfare of the young pear trees, and also may be in a perfect physical condition, but this is not sufficient to insure success in profitable pear growing unless the subsoil be given proper preliminary treatment.

Sometimes the surface soil and the subsoil are practically alike in their composition, as in the case of the majority of alluvial soils, but, as a rule, it will be found that the surface and subsoil differ materially. Often a light sandy loam is found overlying a compact clay subsoil which requires not only stirring with the subsoil plough, but artificial drainage in addition, in order to bring about and maintain its proper



— Fig. 1 —



— Fig. 2 —

Plate No. 16.

Fig. 1 shows how the hardpan prevents development of roots.

Fig. 2 shows free root development.

physical condition. Without proper drainage, such a subsoil will, after being stirred, settle down again into its original compact condition.

The ideal subsoil should be of a fairly open texture, but not too open, for where it is of a loose gravelly or sandy nature, it will usually be found that the surface soil dries out quickly, despite the attention given to it by cultivation, &c.

Thus it is necessary, when establishing the root-bed for trees, to see that both the surface and the subsoil are in a proper physical condition, which is far more important than their mere richness in plant food, as any deficiency in this respect can be easily remedied subsequently.

Method of Breaking up the Soil.—During winter, owing to seasonal rains and the slow evaporation of moisture, the soil is in a suitable condition for the deep primary ploughing and subsoiling. The land should be broken up deeply according to the depth of the surface soil. A depth of 5 or 6 inches will probably be sufficient, but it may be necessary to plough deeper if the depth of the surface soil requires it.

Occasionally, a hard substratum, commonly known as hardpan, will be found to exist, and unless it be broken up, will prove an impenetrable barrier to the roots of fruit trees, debarring them from entering the subsoil, thus causing superficial root ramification and consequent partial starvation of trees, as shown in plate No. 16. With proper soil preparation, this obstruction to growth of trees is removed.

After the work of primary ploughing is completed, attention should be given to subsoiling of land. If a proper subsoil plough is available, this implement should be used, as it does the work in a more satisfactory way than the improvised implement often used for the purpose—an ordinary single-furrow plough with the mouldboard removed. The latter, however, may be used, but the deep stirring of subsoil will thus be necessarily limited as compared with the work of a subsoil plough.

Care is required in the work of subsoiling not to bring any of the sour soil to the surface, the ideal method being to stir it well and deeply, and allow it to remain in its natural position.

Sometimes it will be found, especially in places where the soil is of a shaly nature, that the rock is very near the surface. Where such is the case, the only method of dealing with it is by blasting. The use of gelignite in small quantities (generally one plug to each hole) is effective in fracturing the rock sufficiently to allow of the escape of surplus water. Such formations usually exist on hillsides, and the work should be done along the slope of the land, a charge being placed in each hole about 6 to 8 feet apart in the rows, so that the fracture may extend from hole to hole, and thus prevent pockets for water being formed which would be doing more harm than good to the trees. The rows should be 20 feet apart.

If the land to be planted is in a virgin state, it is not advisable to plant the trees the year that the ground is broken up. This is often done, but generally to the detriment of young trees. Such land is, as a rule, naturally sour, and often harsh and lumpy, and if not turned up and exposed to the ameliorating influence of atmospheric agency, sunlight, &c., will not prove suitable to produce a thrifty growth in the young trees. Not only would the growth of trees be adversely affected, but the work of thorough soil preparation, if attempted subsequently, would be difficult to perform, owing to the presence of trees in the soil.

To plant young trees in sour, unprepared soil is, in most instances, a case of "More haste, less speed," for if the trees were planted twelve months later in soil ameliorated and physically and chemically improved by weathering and working, they would more than make up by their vigour the time lost in planting.

By allowing the ground, after being deeply ploughed and subsoiled in the winter to remain in this condition till late in the following autumn, it will be found that not only has the soil become ameliorated and enriched, but even refractory soils will be far more amenable to treatment in the process of fining them down into a good state of tilth. This desirable soil condition is necessary for the free root ramification of trees when planted, so that they may become firmly established, and allow the delicate young rootlets to abstract the necessary plant food for the development of trees, and subsequently, when they arrive at a bearing age, to enable them to withstand the heavy drain upon them caused through continual cropping.

About May or June, the land lying in rough fallow should be evened down by the use of a cultivator, ploughed again in the opposite direction, harrowed, and, if necessary re-harrowed, in order to bring about a fine soil condition for the reception of young trees.

(To be continued.)

AN ENGLISH OPINION OF AUSTRALIAN WHEAT.

The following extract from *Milling* (Liverpool, England), of 4th January, will interest our wheat-growers:—

"Australians say their bread is the best in the world, and we have frequently sampled its bread made here from an all-Australian grist, which left nothing to be desired in the way of flavour, colour, pile, and yield. We do not say that all Australian wheat is equally good, but there is not another white wheat in the world possessing better all-round bread qualities. This is saying a lot for any wheat—white, red, or yellow—but Australian has other virtues besides those of good bread-making. To the miller it is 'one of the best.'

"It will stand more abuse and treatment than most white wheats. The miller is not afraid of wetting it as he is with the Californian and Blue Stem, or any white wheats, outside Indian. And after he has washed it he is not troubled about grinding it. We have seen it carry 6 per cent. moisture and mill into semolina. Its bran will always fetch a superior price, and because of the pale, creamy tint it will stand more scraping with less colour degradation to the flour than red wheat will.

"Besides this, the offals have a 'bouquet' that makes them appetizing to cattle. We have at home harvested over 11,000,000 quarters of wheat, and some of it is spoiling through dampness. Four weeks in a sack, or two in a deep bin, is as much an average quality home-grown will stand without making a mill-owner uneasy, and the latter's only practical remedy is to mix it with a dry wheat.

"If the miller could get the Australian wheat over, and if he had silo room, British farmers could dismantle their stacks and thresh to their hearts' content. Given the conditions stated, which are plenty of dry (Australian) wheat, plenty of bin room, and enough price inducement, the miller could store away any quantity of British wheat, and the British wheat would be materially raised in value to the grower, and the resultant mixture be of higher value to the consumer—in fact the nation would be a gainer all round."

II.—RESULTS OF WHEAT VARIETY AND MANURIAL TRIALS, SEASON 1918-19.

In addition to the results of variety and manurial trials with wheat published in the March issue of the *Journal*, the results of further experiments, including comparative tests of new crossbred wheats against selected standard varieties, rate of seedling tests, &c., are now available.

Longerenong Experiment Field.

SELECTION TESTS, 1918.

The seed was sown, on 12th June, on well-worked fallow, at the rate of one bushel to the acre, and with 1 cwt. superphosphate. Six inches of rain fell during the growing period of the crop.

Results.

	Bushels per acre.
New Crossbred, Gallipoli	45.8
Federation (selected)	41.1
Federation	38.2
Major	38.1
New Crossbred, Federation x Y. King (12)	38.1
New Crossbred, Bobs x Federation (746)	35.6
New Crossbred, Bobs x Federation (8)	34.8
New Crossbred, Graham	34.6
Yandilla King	34.6
New Crossbred, 196Eau	34.5
New Crossbred, 196tin	34.3
College Eclipse	34.3
New Crossbred, Redilla	33.8
New Crossbred, Stanley x Y. King	33.0
Currawa	32.6
New Crossbred, Stanley x Bobs (78A)	31.7
Dart's	31.1
Minster	29.4
New Crossbred, Thew x Cub (5042)	23.4
Mac's White	22.9

The heavy yield of the new crossbred, Gallipoli, and the enhanced yield of Federation, as a result of systematic selection, are the most striking features. The officer in charge of the plots, Mr. I. Tulloh, reports that Major, Redilla, and Minister were affected by the dry weather in early spring. An excellent example of the relatively high yielding power of barley as compared with wheat, when both are sown on well-worked fallow in the Wimmera, is afforded by comparing the above tests with adjacent plots of selected barleys. These results are typical of those obtained for a number of years past.

RESULTS FROM SELECTED BARLEY PLOTS, 1918.

						Bushels per acre.
Oregon	..	..	..	..	..	76.2
Gisborne	..	..	..	..	..	69.4
Pryor	..	..	..	..	..	67.0
Cape	..	..	..	..	..	65.0
Archer	..	..	..	..	..	64.7
Squarehead	..	..	..	..	..	58.7
Shorthed	..	..	..	..	..	56.9
Kinver	..	..	..	..	..	55.9

It will be noted that, though Oregon barley (Cape type) has, as usual, headed the list, Gisborne and Pryor, two malting barleys, have done exceedingly well. In view of the fact that malting barleys are commonly regarded as the more delicate of the two, the following remarks of the officer in charge are of interest:—"The malting barleys yielded exceptionally well. Their short straw and earliness in ripening especially suits them to this district, and they stand up very well at harvest time. Most of the barleys of the Cape type, being much taller in the straw than the malting varieties, are liable to go down at harvest time, and are difficult to strip on this account."

The influence of the rate of seeding, and also of the time of sowing, on the yields of Federation wheat have also been the subject of investigation.

RESULTS OF RATE OF SEEDING TESTS, 1918.

Federation Wheat—Manure, 1 cwt. per acre.

Early Sowing—31st May, 1918.

Weight of seed.						Yield—Bushels per acre.
30 lbs. per acre	..	..	..	..	..	33.8
45 " "	..	..	..	..	..	34.6
60 " "	..	..	..	..	..	40.1
75 " "	..	..	..	..	..	42.4
90 " "	..	..	..	..	..	41.1
120 " "	..	..	..	..	..	41.4

Late Sowing—10th July, 1918.

Weight of seed.						Yield—Bushels per acre.
30 lbs. per acre	..	..	..	..	..	39.4
45 " "	..	..	..	..	..	42.4
60 " "	..	..	..	..	..	42.9
75 " "	..	..	..	..	..	44.6
90 " "	..	..	..	..	..	46.8
120 " "	..	..	..	..	..	47.0

Mr. Tulloh reported that both sowings germinated evenly, and that the late sown plots were entirely free from weeds, and the early sown one comparatively clean. The straw on the early sown plots, which were not fed off, was six inches taller than that of the corresponding plots in the group sown late.

It will be noticed that the results show that the plots sown in July were more productive than those sown earlier. In this they confirm the general experience of Wimmera farmers, that profitable sowings may be made much later than should be attempted in the other wheat-growing districts of the State. The results also show a regular increase in yield with increasing quantities of seed up to 75 lbs. per acre in the case of early sown plots, while in those sown later steadily increased yields were obtained with seedings up to as high as 120 lbs. per acre.

In view of these results, the tendency of numbers of Wimmera farmers, particularly at Minyip, to increase the quantity of wheat sown up to 75 lbs. per acre is evidently a movement in the right direction.

The effect of varying times of sowing on the relative yielding capacity of representative early mid-season and late wheats has also been tested.

RESULTS, 1918.

The Early Sowing was made 31st May, and the Late Sowing, 10th July.

Variety.	Type.	Yield when Sown Early.	Yield when Sown Late.
		Bushels per acre.	Bushels per acre.
King's Early	Early, i.e., quick maturing	32·0	39·0
Bunyip	"	28·1	30·7
Dart's	Midseason	30·33	37·5
Federation	"	42·2	44·2
Yandilla King	Late, i.e., slow maturing ..	32·5	31·4
Marshall's No. 3	"	34·6	37·0

It was noted when the early varieties were sown in May they lodged, but when sown later in July there was no lodging.

The early varieties yielded better when sown late, but even then they did not do so well as the mid-season varieties sown at the same time. Of the late varieties, Yandilla King did best when sown about 1st of June, but with Marshall's No. 3 the contrary was the case.

It is probable that had the July sowing been still further delayed the early wheats would have done relatively better than other varieties sown at the same time, and therein lies their special value. When the seeding season has been protracted, and it is too late to sow the ordinary varieties, early varieties such as King's Early and Bunyip may be sown with much greater prospect of success.

Variety Tests, Mallee Experimental Plots.

During the past four years the Department of Agriculture has conducted comparative tests with wheat varieties, and also with manures, for wheat at three representative centres in the newer Mallee areas, viz., Ouyen, Cowangie, and Carwarup.

The results of the manurial tests which have already been published demonstrate that the dressings of superphosphate usually applied to wheat in these districts, viz., 30 lbs., might profitably be increased. Similarly the tests with wheats show that some varieties are considerably more profitable to grow than others.

One of the outstanding features of the results this year is the comparatively high yields obtained from the barleys, which were tested alongside wheat and grown under the same conditions. The performance of these barleys under dry Mallee conditions adequately confirm the contention often put forward by the Department as to their drought-resisting qualities.

RESULTS, 1918—CARWARP.

Plots sown on fallowed land, 8th May, 1918, 45 lbs. seed and 80 lbs. superphosph. a
Bushels per acre.

Currawa	18.1
New Crossbred, Gallipoli	17.0
Penny	16.2
Dart's Imperial	15.4
Minister	15.2
Mac's White	13.8
Major	13.7
Gluyas	13.3
Yandilla King	13.0
New Crossbred (4006)	12.2
Federation (acclimatised)	12.1
New Crossbred, Graham	12.0
Federation (Longerenong seed)	11.8
Federation (Rutherglen seed)	11.6

BARLEY VARIETIES.

Sown on fallowed land, 8th May, 55 lbs. seed, 60 lbs. superphosphate.

	Bushels per acre.
Oregon barley	34.1
Cape barley	30.4

The experimenter at Carwarp, Mr. P. G. Stewart, M.L.A., in forwarding the results, makes the following comments:—"The outstanding feature of the plots this year has been the comparative failure of Federation wheat; this has been the case each year for the past three seasons, and evidently it is not the most suitable variety for the light sandy soils such as are found at Carwarp. Federation is unsuitable here for other reasons; for instance, it does not grow high enough to clear the mallee shoots at stripping time, and the straw does not burn as well as most other varieties.

"I consider that Currawa, Dart's Imperial, Penny, or Mac's White are better varieties than Federation on this newer Mallee country. Currawa has proved a good wheat in both the heavy and light soils of the Carwarp district. The same can be said of Penny. In very sandy land Dart's Imperial holds its own against other varieties; it is, however, liable to 'burn off' on the heavier land.

"Major seemed more affected by the dry spring this year than the other varieties.

"Of the new varieties, the new cross-bred, Gallipoli, showed considerable promise, while Minister should also prove a good wheat, and it weighs exceptionally well.

"I had some difficulty in making a clean sample with the barley."

The contention of Mr. Stewart that Currawa, Mac's White, Dart's Imperial, and Penny are better than Federation for Carwarp is borne out by the following table, which is a summary of the yields at the Carwarp plots since their inception three years ago.

Tables showing the average yields of wheat at Carwarp, 1916-18—

	Bushels per acre.
Currawa	18.4
Mac's White	17.8
Dart's Imperial	17.6
Penny	
Yandilla King	16.5
Gluyas	15.9
Federation	14.9

RESULTS AT COWANGIE, 1918.

Plots sown on fallowed land, 45 lbs. seed and 60 lbs. superphosphate.

	Bushels per acre.
New Crossbred, Wheat (No. 4006)	25·8
Penny	25·6
Federation (Rutherglen seed)	24·6
Federation (Longerenong seed)	24·3
New Crossbred, Gallipoli	24·1
Gluyas	24·1
Federation (acclimatised seed)	22·9
Major	22·8
Dart's Imperial	22·7
Minister	22·7
New Crossbred, Graham	22·5
Yandilla King	22·2
Currawa	21·3
Mac's White	21·2

The soil on which these plots are situated is a relatively fertile red loam, consequently the yields are good, notwithstanding the dry spring.

The experimenter at Cowangie, Mr. H. F. Hecht, in his report remarks that, as expected, the early and midsummer wheats, on the whole, did best this year at his farm. Of the four new varieties tried, Crossbred 4006 gave the highest yield. It is very early, but has a rather weak straw. Gallipoli turned out very much better than its appearance in the field had indicated, while Minister, though it felt the effects of the dry spring, is a wheat which stands up well.

The results over the past four years show that, contrary to the experience at Carwarp and Ouyen, Federation has more than held its own. The next best varieties in order of yield are Penny, Dart's, and Currawa respectively.

The following table gives the average yields at Cowangie for the past four years, 1915-1918:—

	Bushels per acre.
Federation	28·3
Penny	25·9
Dart's	24·7
Currawa	25·5
Major	23·4
Yandilla King	22·8

Ouyen Experiments.

The variety trials, unfortunately, lapsed at Ouyen last year, but the following table expresses the average results for the three previous years. It will be noted that, as at Carwarp, Federation has not done so well as several other varieties.

At Ouyen, the plots have been sown on stubble land each year, with 45 lbs. seed and 60 lbs. of superphosphate.

Table showing average results at Ouyen for three years, 1915 and 1917:—

	Bushels per acre.
Dart's Imperial	21·2
Yandilla King	21·2
Currawa	20·6
Gluyas	20·1
Federation	19·5

THE FLAX INDUSTRY.

J. Robilliard, Senior Inspector, Farm Products.

Flax has been grown to a limited extent in this State, chiefly in Gippsland, for many years past, and though encouragement in the form of a bonus was given to growers by the State Government some years ago, and recently by the Commonwealth Government, the industry has not made the progress it merited, or that was anticipated.

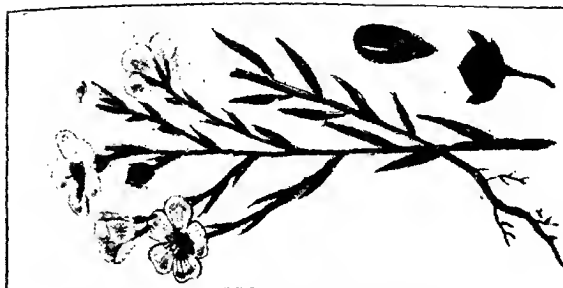
The experience gained, however, has clearly proved that, given proper conditions, flax will grow well in many parts of the State, and in normal seasons give satisfactory yields of both seed and fibre.

There is a local demand, which may be greatly increased, for a considerable quantity of both products, which, up to the present, has been only partially supplied. Should the area under flax be so increased as to produce more fibre than is required for home consumption, there exists a practically unlimited market in the United Kingdom at prices which at present rates should prove remunerative.

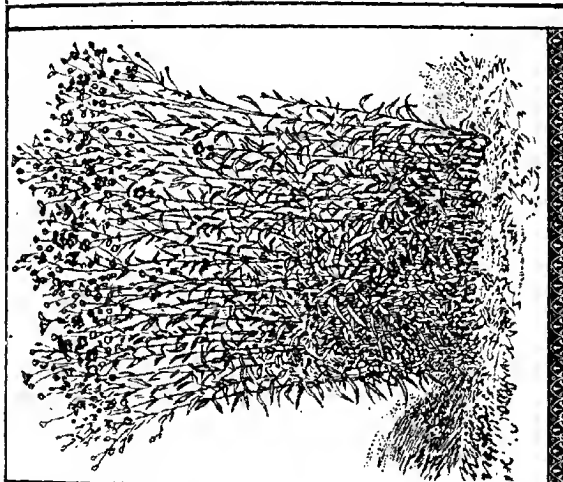
Prior to the war Russia produced about 80 per cent. of the world's requirements of flax fibre, the export of which was, of course, stopped at the outbreak of war; and with that portion of the Russian country where the crop was largely grown falling into enemy hands, the industry, if not temporarily stopped, must have received a very severe check, and owing to present conditions it is unlikely that Russia will for quite a long time be in a position to produce quantities equal to her former output. Belgium and the North of France also exported a fairly large proportion, but they, too, will probably not be in a position to produce normal quantities for a considerable period. The very great shortage has naturally caused a rapid increase in flax values, recently reaching high figures; present prices may not be maintained, but, taking all things into consideration, it is only reasonable to suppose that flax will for several years hence command fairly high prices. Then should not Victorian farmers in suitable localities give flax cultivation their serious consideration?

Not being able to obtain their supply of flax from the customary sources, the British Government were forced to look for it elsewhere, and about twelve months ago arranged to purchase, at a satisfactory figure, the fibre produced from all flax grown in Australia during the last year. This enabled the Commonwealth Government to guarantee growers £5 per ton for unthreshed flax of a given standard. A committee was appointed to encourage its cultivation, and their efforts resulted in about 1,500 acres being sown, the product of which is now being treated.

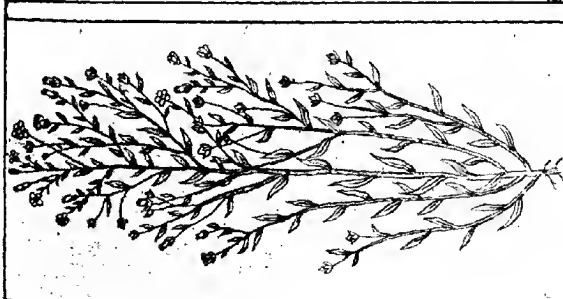
The Commonwealth Government is now guaranteeing the growers £6 per ton for all fibre flax of standard quality grown this year. The standard quality means well-grown, unthreshed flax, appraised by the committee as of average quality, of average length in sheaf of 30 inches, well seeded, free from disease, weeds, and foreign matter, properly harvested, properly tied, and delivered in good order and condition to the nearest scutch mill.



Flax Plant.



Flax for Fibre.



Flax grown for Seed.

Flax Cultivation.

(*Linum Usitatissimum*.)

It is commonly stated that it is impossible to produce a good grade of flax fibre without sacrificing the seed. This, however, is a misconception, and European authorities are now advocating the production of both from the same crop. This practice has been followed in Victoria, and where the climatic conditions are suitable the resulting fibre is found to be of satisfactory quality, and compares very favorably with that grown in other countries.

Climatic Conditions.

The successful growing of a crop from which both fibre and seed may be profitably obtained requires an annual rainfall of from 26 inches upwards, with a reasonable proportion distributed throughout the growing period and preferably with frequent showers in spring; though if seed only be the object, it may be successfully grown in districts having a somewhat lesser rainfall.

Soil.

Flax will grow on a wide range of soils, but a warm, reasonably free soil is required, in a good state of fertility, well drained and free from weeds. It is, therefore, rather difficult to name any particular class of land as really the best. A very good soil, however, is a chocolate or rich and fairly deep loam overlying a well-drained clay subsoil, while extremes of clay, light sand, wet, or poor land of any description should be avoided.

As a further guide to suitable soil, situation, and climatic conditions, it may be stated that, generally speaking, flax will probably give satisfactory returns on land that is capable of producing a heavy crop of oaten hay.

Preparation of Seed Bed.

The land should be clean, or as nearly as possible free from all kinds of weeds, but more especially strong or tall-growing ones, such as wild turnip, dock, thistle, &c. If they appear after growth has commenced they must be cut out at the most suitable period, for weeds not only occupy space that should be growing flax, but cause considerable trouble and loss in the treatment of the fibre.

It is very necessary that the soil should be well worked, thoroughly pulverized to a fine tilth, and made as level as practicable, thus ensuring an even depth when sowing, a more uniform growth of plants, greater ease in harvesting, and permitting the crop to be cut lower than would otherwise be the case, resulting in a heavier yield and longer fibre.

Varieties.

Several varieties are cultivated commercially, some of which are grown for seed purposes only and considered unsuitable for fibre, while others are grown for fibre, or, for the dual purpose of both fibre and seed.

Some years ago about half-a-dozen varieties, including both blue and white flowering sorts, were introduced and tested, but it is stated

that neither proved as suitable for the production of fibre and seed as that introduced many years ago, and from which satisfactory yields have been obtained; consequently the former varieties have been discarded and the latter retained and is the only one at present grown in this State for commercial purposes and recommended for cultivation.

It is interesting to note, however, that during the past year experiments in the matter of seed selection have been made at the Werribee Research Farm, a short account of which, with illustrations, appeared in last month's journal. The experiments at Werribee will, no doubt, be carried out on a larger scale during the coming season, and it is hoped that more suitable or better yielding kinds may be obtained.



Cutting Flax Crop at Mr. E. R. Morton's.

Seeding.

Victorian experience covering a number of years has shown that, under normal conditions, the best time for sowing is during the latter part of April or the first week in May; but in very late districts or moist situations the time may be varied somewhat to suit local conditions. Nevertheless, early sowing is strongly recommended, the object being to have strong, well-rooted, and firmly-established plants before depth of winter, which would be ready to make rapid growth with the approach of warmer weather. Early sowing is likely to produce a tall crop and consequently long fibre, and in the event of caterpillars being plentiful, the bolls or seed, of which they are very fond, should be so far matured that the pest will leave it for more succulent food. A fibre crop requires to be sown thickly, so as to insure tall stalks with few branches, and for this purpose from 56 to 60 lbs. of seed per acre is recommended, though some growers sow up to 65 lbs. The seed should preferably be sown broadcast, and this can be done with an ordinary drill, by lifting the tubes and allowing the seed to fall on a board and scatter.

The quantity of seed mentioned can be readily sown by itself, and, therefore, should not be first mixed with manure, as if left for a time before sowing, the seed is liable to injury.

If a crop of seed only (not fibre) is aimed at, a sowing of from 20 to 30 lbs. per acre, according to local conditions, should be sufficient, as this would allow the plants plenty of room for growth and branching.

Manures.

On this subject, also, there is much room for experimental work, which in all probability will be carried out, as far as possible, this season in several centres, and it is hoped that useful data will be secured for next year's operations. For the present, however, it may be stated that bone or bone and super. in equal proportions give good results, and is usually applied rather more freely than for a cereal crop, for, as previously stated, it is desirable that the young plants should in every way be helped to make good growth before winter.



Flax Crop of Messrs. Orr Bros., of Dalmore.

Harvesting.

The best time for harvesting is when most of the bolls have turned brown, though some of the lower ones may yet be more or less green. A further guide is that the stems at this stage usually, but not necessarily, begin to turn yellow, and the lower leaves to drop off, though, if in a moist situation, the plants may not lose their foliage so early.

Flax can readily be cut with a reaper and binder, but the machine must be in good working order; plain knives are best, and require to be well sharpened; an old, well-worn machine with blunt blades would probably give a lot of trouble. Sheaves should be small, well butted, and tied rather nearer the head than otherwise, the bands having a tendency to slip down.

Long narrow stooks are best, and should be stacked as soon as ready, as standing in the paddock longer than necessary causes loss.

In the Drouin and Warragul districts a yield of from 2 to 2½ tons per acre is considered good, though 2½ tons is not uncommon, while anything above that is exceptional.



Flax Threshing at Messrs. Wolff Bros., Drouin.



Flax at the Buln Buln Mill spread for Retting.

Flax Mills.

Two flax scutching mills (those of Messrs. Wolff Bros., of Drouin, and F. C. Jencke, of Longwarry South) have been working for many years past, treating the material grown in these districts. During the past season Messrs. Wolff Bros. have found it necessary to increase the capacity of their plant considerably, and two co-operative mills have been started—one at Buln Buln and the other at Dalmore, each to treat the flax grown in their vicinity.

Processing Flax.

The first process to which flax is submitted is that of "threshing" or "boll crushing"; this is accomplished by the aid of a flax thrasher as shown in the illustration, the operator standing opposite the end of the shafting and holding the sheaf by the butt, with the head spread out fan-like, allows it to pass between the revolving rollers, thus crushing the bolls and liberating the seed, which is then conveyed by an endless belt in a chute to the winnower and cleaned.



"Picking up" and stacking retted straw at Messrs. Wolff Bros.

Retting.

Retting is done in one of two ways, known respectively as water retting and dew retting.

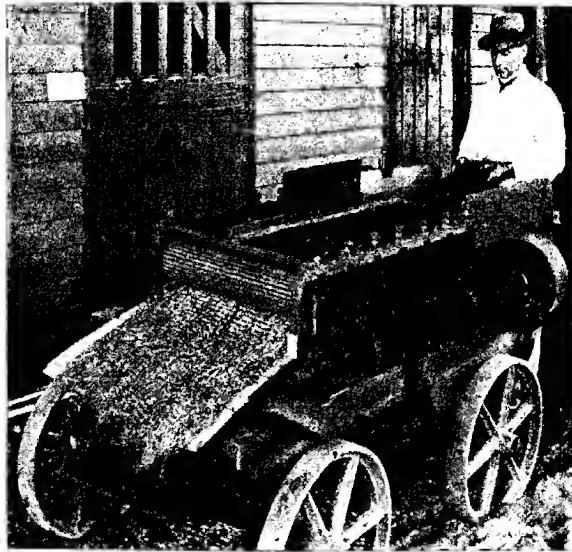
In Belgium, where the highest grade of fibre is produced, the flax is retted by placing it in crates and steeping for a given period in the river Lys, a slow-flowing stream, whose waters are peculiarly suitable for the purpose.

In Ireland and other places the flax is placed on end in pits of 4 or 5 feet in depth, and varying in length and width to suit requirements, then weighted down to prevent floating, and covered with water until sufficiently retted.

The method practised in this State is "dew retting"; this is accomplished by spreading the threshed straw in a thin layer in long rows

few inches apart on a grass paddock, the heads of all straw lying in the same direction.

Though termed "dew retting," the dew, rain, and sunshine all play a part in the process. The length of time the straw is left out varies considerably, but is usually five or six weeks, according to weather conditions. To insure even retting the flax has to be turned once or twice during that time. This is readily done by commencing with the outside row, and pushing the end of a long slender rod under the straw just below the heads to a distance of 3 or 4 feet, then lifting the straw and turning it right over with the heads pointing the opposite direction, the second row being turned so as to lay on the ground from which the first has been removed.

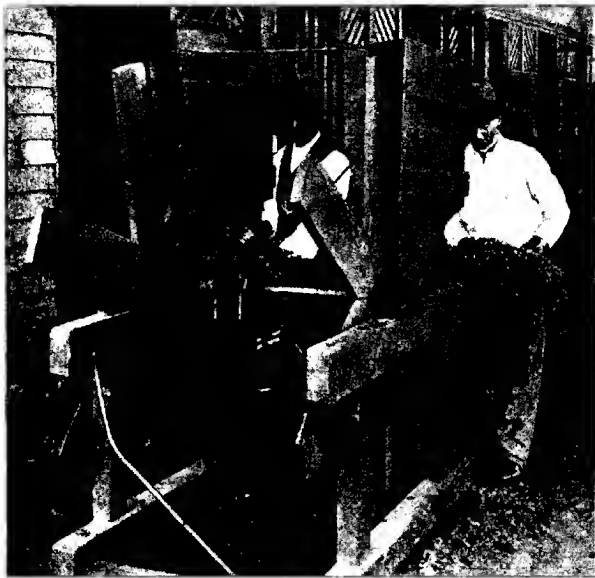


Flax Breaking.

The success or otherwise of a scutch mill depends largely on the straw being correctly retted, for both under- or over-retting mean much loss of time and material. Retting is a process of decomposition, which must proceed far enough to destroy the gummy matter holding the fibre to the woody portion so as to allow the latter to be fairly readily, but not too easily, beaten from the former. If allowed to go beyond this stage, the woody material could be more easily brushed off, but the fibre would lose strength, and, if left long enough, become valueless.

When sufficiently retted the straw is picked up, tied in bundles, and, if not quite dry enough, stood in stooks and then stacked until ready for the breaker.

As much of the retting as possible must be done in autumn and the balance in spring, the months of June and July being avoided. Spreading should be commenced as soon as practicable after threshing; but, as it is necessary to have fine weather to dry the straw when "picking up," it should be continued after, say, the end of March, so that it may be gathered in by the middle of May; even earlier would be better, for after that the weather is usually very broken, and drying the straw would be rendered exceedingly difficult, and if not dried and stacked when ready much loss may result.



Flax Scutching.

Breaking.

The breaker consists of several pairs of fluted rollers, the upper ones being pressed against the lower ones with springs. The flax is separated into small bundles of about as much as can be grasped in one hand, then spread in a thin layer the full width of the rollers and allowed to pass between them to the opposite end; the woody portion is thus broken into short lengths known as "shoves."

Scutching.

From the breaker the flax is passed to the first scutcher, where it is roughly dressed. The operator holds a handful by one end in his left hand, and with his right spreads and guides it to the beaters, running at about 300 revolutions per minute, and when roughly cleaned passes it to the second scutcher, which, in a similar manner, finishes the cleaning process. The only remaining operation is bundling and baling, and when these are completed, the flax will be ready for marketing.

TOMATO DISEASES.

By C. C. Brittlebank, Plant Pathologist.

I.

The tomato industry in Victoria has, within the past ten to fifteen years, greatly increased, and it would be interesting to know the area under and returns from this crop, but no records have been kept.

As might be expected, when such a crop has been grown continuously in certain areas, and under forced conditions, diseases have become established, which claim a greater or less percentage of the yield. Thirty years ago (1886) paddocks of 30 or 40 acres of tomato plants were practically free from disease. Since then, however, several diseases have developed, and the object of this article is to describe briefly their appearance and the methods of control, so far as they are known at the present time.

The following diseases of tomato plants are found in Victoria:—

Alternaria solani, E. et M.—“Leaf mould,” or “Target spot.”

Septoria lycopersici, Speg.—“Leaf spot,” “Rust,” “Leaf blight.”

Fusarium solani (Mart), Sacc.—“Wilt,” “Sleepy disease.”

Sclerotinia—“Sclerotium disease.”

Rhizoctonia solani, Kenlu.—“Root rot.”

Phytophthora infestans, De Bry.—“Irish potato blight.”

Bacillus solanacearum, E. F. Smith.—“Brown rot,” “Wilt.”

A New Tomato Disease—“Spotted Wilt.”

To the list above must be added a disease which has, within the last three years, appeared in tomato plants. The origin of this disease, as well as how and whence it was introduced, is, so far, unknown. Unfortunately, up to the present time no causal organism has been isolated, and consequently no method of control has been devised. However, it is the intention of the Science Branch of the Department of Agriculture to carry out experiments during the coming year, with the object of endeavouring to ascertain the cause of the disease and the method of controlling it.

A feature of this new tomato disease is that its most virulent period is during the prevalence of swarms of “Canary flies,” or “Jassids.” During the season just ended it was noted that as the Jassids decreased in numbers the disease waned, and the later plants were only slightly affected, while in many cases they have recovered to a great extent, but odd plants are still developing the disease. Numbers of early plants, which became diseased about January, have recovered also. As this disease is the most serious that the tomato grower has to contend against, and has been the cause of heavy losses in recent seasons, I shall deal with it first. It is well to have a common name for every tomato disease, and I propose that of “Spotted Wilt” for this latest one, from the spotting and subsequent wilting of the attacked plants.

Spotted Wilt was first observed during the 1915-16 season, when the injury was slight owing to the restricted area over which the disease had spread and to the comparatively small number of plants affected. In the following year the number of diseased plants had increased to an alarming extent. The present season (1918-19) has, to say the least, been disastrous, and fully 50 per cent. of suburban garden plants have

been destroyed. In the country districts the disease has made considerable progress, and diseased plants have been found in nearly all parts of *Victoria*.

Symptoms of the Disease.

The affected plants usually show the earliest evidence of attack on the young terminal leaves, from which it spreads rapidly to the lower leaves.

Affected leaves at first show a slight discoloration on the surface, and later numerous distinct blackish, or brownish, spots develop on their upper surfaces, sometimes, though not often, appearing also on the under side. If a leaf be held up to the light the spots will be seen distinctly as a pattern between the main veins. They may, however, be confluent when the whole leaf, with the exception of the main veins, is opaque.

A more critical examination disclosed the fact that the veins in some cases, as well as the mesophyll of the leaf, are also discoloured. Sometimes one-half of the veins are black or brown along some part of their length, and the other part clear or semi-transparent. Sections show that the vascular bundles are affected, but the injury to the leaf is almost always confined to the upper cells only.

The remarkable feature of the disease is the rapidity of its action. Plants, apparently healthy, develop within a few hours slight spotting of the leaves, and completely wilt from the tops downward in about 24 to 30 hours. Occasionally affected plants may last for several days, but in the majority of cases wilting and death take place rapidly.

Spotting is not confined to the leaves, but occurs on petioles and stem, appearing either as minute spots or thin brownish black lines or streaks, varying from 5 to 8 m.m. long by 1 to 5 m.m. broad.

On the stem and petioles the spotting is entirely superficial, and is restricted to the outermost cortical and epidermal cells. The fruit is affected also, and the spots vary from a few to a number so great as to become confluent. The spots are of different size and shape, varying chiefly from circular to oblong, sunken or superficial, and in colour from brown to brownish black. In severe cases the tissue beneath the spots is injured and discoloured for a considerable depth into the flesh of the fruit. Diseased fruits, as a rule, fall, and those remaining on the plant do not ripen, or only redden in part, and are quite unfit for market. As a rule, however, affected plants fail to produce fruit, except in those cases where the plants have been affected late in the season. Very young fruits when affected turn brown, shrivel, and fall.

If the stem of the affected plants be split or cut through, no discoloration will be observed. The pith in parts is normal, and in others dry, shrunken, and cracked, forming numerous partitions, with spaces between, leaving sections of the stem more or less hollow. The disease does not affect the root system, which is usually of normal development, and in no way discoloured, and showing no signs of attack, either by fungi or nematodes. Careful microscopical examination has, so far, failed to reveal either fungi or bacteria within the plant tissue, and cultural methods have also failed to produce any organism.

Strong, vigorous, and luxuriant plants seem, on the whole, to be more subject to attack, but thrifty and unthrifty are liable to infection.

Dwarf varieties appear to be best able to resist attacks, the later planted bushes are not so seriously affected.

Experimental Work.

A number of experiments have been carried out in various ways with the sap expressed from diseased leaves; others with fragments of diseased leaves inserted in both stem and leaf. Portions of badly affected plants have been placed on the terminal shoots of healthy plants, and kept under bell jars at temperatures varying from 30 deg. to 40 deg. C., and in air having a heavy moisture content. A number of diseased terminal leaves and stems were crushed to pulp, water was added, and the combination filtered, and the filtrate mixed with soil in which young plants were growing; diseased leaves were crushed, and the pulp placed in the crowns of terminal shoots, some of which were pricked with a sterile needle, and sap from diseased leaves sprayed over young plants. All the plants, with the exception of two, were kept under bell jars, and under conditions which were most favorable for the development of either fungi or bacteria. No disease developed in any of the plants, and the checks both under and out of the bell jars remained clean.

The experiments and examination having failed to discover any causal organism, specimens of diseased plants were forwarded to Dr. Bull, Government Bacteriologist, and he also was unable to find any organism connected with the trouble. Thus the several investigations have thrown no light on the nature of the disease. Though the appearance of affected plants to the naked eye, the symptoms, rapid development of the discoloured areas, wilting and death of plants have all the characteristics of a bacterial disease rather than one of a physiological nature, fungi and bacteria are not present, or, at any rate, have not been isolated.

The Disease in Other Countries.

Looking up literature dealing with diseases affecting the tomato in various countries, I find that in the United States of America there is a disease which so closely resembles the one under notice that in all probability they are identical.

Professor Selby (Bulletin 73, Ohio Agricultural Exp. Station) gives the following description:—"An obscure disease of greenhouse tomatoes caused much anxiety at the station in the spring of 1895. Specimens of the same trouble have been received for examination; it also reappeared in 1896. This trouble shows itself as a general blighting of the plants attacked, and exhibits much of the same symptoms as winter blight, described in Bulletin 43 of the Experiment Station of Cornell University. In the present case the younger leaves showed earliest indications of the disease, and had a drooping appearance, with the leaflet turned inwards at the margins, and occasional dead areas. The attacked leaves soon die, and hang from the more or less drooping leaf stock. The thriftiest and most vigorous plants were apparently as commonly attacked as the others; the later plantings suffered most. The stems and leaf stalks of the affected plants showed blackened, elongated spots upon them. In the house where the trouble prevailed the green fruits were marked with dark-brown irregular spots of varying diameter. . . . For this blight no cause is at present assigned, and no organisms were found associated with it."

Later Investigations in the United States of America.

Hereunder are a few extracts from *Phytopathology*, vol. 6, No. 2, p. 162, 1916, "Investigation of a Troublesome Disease in Winter Tomatoes," by J. C. Howitt and R. E. Stone, giving results of examinations into the cause of the same mysterious disease:—

"In 1914, tomato plants were forwarded which showed a marked diseased condition of the leaves, stems, and fruit. Ten per cent. of the plants in the house were attacked. The disease appeared in the same house the following year. In August, 1915, the disease was observed in field tomatoes in two localities."

"Specimens showing symptoms of the disease were forwarded to Professor A. D. Selby for examination. These were examined by Mr. A. S. Orcut, who reported as follows:—'Upon examining the tomato material, and conferring with Professor Selby, it is our opinion that this is the same trouble which was reported from this section in 1896.'"

"The same disease apparently also occurs in the vicinity of Philadelphia. In January, 1915, diseased plants were forwarded to Messrs. Howitt and Stone by Professor C. R. Orton, Plant Pathologist, Pennsylvania State College. These, when carefully examined, were found to have spots and lesions on the stems, leaves and fruits characteristic of the disease as it occurs in Ontario."

SYMPTOMS OF THE DISEASE.

"The disease affects leaves, stems, and fruits. Affected leaves show distinct brown and blackened areas scattered between the layer veins. These are angular, or somewhat diamond-shaped, and are usually so numerous and close together that a distinct pattern is seen when affected leaves are held up to the light. An examination with a hand lens reveals the fact that discoloration is not confined to the mesophyll of the leaf, but extends to the secondary veins of the vascular bundles, is clearly evident. Affected leaves do not develop normally. They at first appear somewhat stunted, and, as the disease progresses, droop, and finally wither and die. In most cases observed the disease appeared to start on the upper younger leaves, and gradually work downward to the older leaves. On the stems of affected plants brown lesions are usually seen. These vary in size from 1 to 3 c.m. long, and almost half as wide."

ATTEMPTS TO DISCOVER THE CAUSAL ORGANISMS.

"When the diseased plants were received, a superficial examination disclosed the blackening and browning of the vascular bundles of the leaves. This symptom suggested that the trouble might be brown rot of tomato caused by *Bacillus solanacearum*, E.F.S. Microscopic examinations were made, but no fungus or bacteria were found associated with the lesions on leaves, stems, or fruit.

"Dilution plate cultures were made, but nothing was found to which the disease could be attributed. Fearing that in some way our technique might be at fault, specimens of diseased plants were submitted for examination to Dr. E. F. Smith, Bureau of Plant Industry, Washington, D.C.; Professor A. D. Selby, Agricultural Experiment Station, Wooster, Ohio; Dr. E. A. Bessey, Michigan Agricultural College; and Professor D. Jones, of the Bacteriological Department of Ontario Agricultural College.

"All these gentlemen kindly examined the material supplied, and reported the result. None of them found any organism capable of producing the disease."

EXPERIMENTAL WORK.

"Experiments were performed to determine if the origin of the disease was in the soil. These experiments, while by no means conclusive, suggests that the origin of the disease may be in the soil."

SUMMARY.

- "1. This disease is widespread, and may result in serious loss.
- "2. Little is known as to the cause of the disease.
- "3. Repeated microscopical examinations and plate culture tests with various media have failed to disclose a causal organism.
- "4. Inoculation experiments have given negative results.
- "5. The position and nature of the leaves, and the fact that the disease fails to develop further in affected fruits when these are removed from the plants and placed in a moist chamber, indicates that this is a so-called physiological trouble.
- "6. The experiments with hydrocyanic acid gas indicate that fumigation does not cause the disease.
- "7. Experiments on sterilized soil seem to indicate that the origin of the disease is in some way connected with the soil, but as no causal organism has been formed it would seem that the disease might be due to some chemical or physical deficiency in the soil, which is apparently overcome by sterilization.
- "8. This account of the disease is published with the object of again calling attention of plant pathologists to it, with the hope of stimulating discussion and research regarding its cause and control."

This disease in tomato plants which has been under investigation by American plant pathologists is, I think, identical with the one which I have named Spotted Wilt. The appearance, symptoms, and failure to obtain any causal organism agree. Further, the disease differs from all known tomato troubles caused by fungi, bacteria, or nematodes. The disease is a serious one, and threatens the tomato industry, probably to a far greater extent than all the other diseases which have found a place here.

PRACTICALLY the whole of the paper used in Australia at present is imported, and a considerable number of investigations and inquiries have been made with a view to finding some suitable raw material in Australia from which paper can be manufactured in large quantities. The importance of this matter, and the possibilities of establishing the industry of Australia, can be gauged by the fact that the annual imports of paper into Australia are valued at no less than £1,500,000.

The whole question has received the attention of the Commonwealth Institute of Science and Industry, which has issued a Bulletin giving the results of some investigations of much interest and importance which have been carried out by the Institute.

Copies of the Bulletin may be obtained free on application to the Secretary, Institute of Science and Industry, 314 Albert-street, East Melbourne.

STANDARD TEST COWS.

Report for Quarter ending 31st December, 1918.

Eighty-one cows completed the term, of which number 74 qualified for Certificates.

The following are the individual records:—

W. K. ATKINSON, Swan Hill. (Shorthorn.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Duchess 43rd ..	Not yet allotted	18.1.18	273	lbs. 10	lbs. 4,862	4.20	lbs. 204.43	lbs. 200	lbs. 233

Mrs. A. BLACK, Noorat. (Jersey).

Completed since last report, 4. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Marguerite ..	3576	20.3.18	273	lbs. 4	lbs. 6,137	4.44	lbs. 272.66	lbs. 250	lbs. 311

DEPARTMENT OF AGRICULTURE, Wyuna. (Jersey and Friesian).

Completed since last report, 2. Certificated, 2.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Jersey ..				lbs.	lbs.		lbs.	lbs.	lbs.
Baroness of Wyuna ..	4381	10.1.18	273	21	6,812	5.68	388.97	250	441
Friesian —									
Dominion Milkmaid ..	714 N.Z.	13.1.18	273	32	10,451	3.73	390.10	250	445

C. G. KNIGHT, Cobram. (Jersey.)

Completed since last report, 6. Certificated, 6.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Pastime of Tarnparr ..	5164	1.1.18	273	lbs. 204	lbs. 5,025	5.76	lbs. 289.39	lbs. 175	lbs. 339
Princess of Tarnparr ..	2086	1.1.18	273	17	7,333	5.01	367.72	250	419
Christmas ..	4208	20.2.18	273	18	5,824	6.42	374.16	250	426
Miss Fox of Tarnparr ..	5162	17.3.18	273	26	7,244	5.82	421.57	175	480
Postcard of Tarnparr ..	5167	26.3.18	273	14	4,955	6.81	337.57	175	384
Trixie of Tarnparr ..	5173	26.3.18	273	15	5,476	6.45	355.45	175	405

DEPARTMENT OF AGRICULTURE, Werribee. (Red Poll.)

Completed since last report. 12. Certificated, 9.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Birdseye	Not yet allotted	26.12.17	273	lbs. 15	lbs. 7,202	5.00	lbs. 360.31	lbs. 250	lbs. 410½
Crimesa	"	26.12.17	273	17½	5,917	3.98	235.36	175	268
Persica	"	26.12.17	273	24	7,519	4.74	356.20	250	406
Scotia	"	27.12.17	273	21	7,036	4.32	303.93	175	346½
La Belle France ..	"	29.12.17	278	15	8,095	4.35	362.05	250	404½
La Plata	"	30.12.17	273	19	6,373	3.94	251.57	175	286½
Brian	"	8.1.18	273	17	6,783	4.37	296.55	250	391
Empire	"	31.1.18	273	14½	5,950	4.09	282.50	250	321½
Santa Clara	"	8.2.18	273	19½	7,227	4.59	331.89	250	378½

G. M. GANGE, Junr., Mininera. (Ayrshire.)

Completed since last report. 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Gordina of Seafeld ..	Not yet allotted	10.2.18	273	lbs. 12	lbs. 6,784	4.68	lbs. 317.46	lbs. 250	lbs. 302

GEELONG HARBOR TRUST, Marshelltown. (Ayrshire.)

Completed since last report, 3. Certificated, 3.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Sylvia of Sparrovale ..	2515	3.1.18	273	lbs. 5	lbs. 6,758	4.17	lbs. 283.10	lbs. 250	lbs. 322½
Phoebe of Sparrovale ..	2874	21.1.18	273	15½	7,429	4.43	358.02	250	374
Mower of Sparrovale ..	3893	15.3.18	273	21½	6,650	4.66	311.22	250	354½

T. HARVEY, Boisdale. (Jersey.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Bluebell of Jerseyholm ..	Not yet allotted	*27.3.18	273	lbs. 9½	lbs. 5,885	6.27	lbs. 243.72	lbs. 175	lbs. 277½

* Calved 6 weeks prematurely.

S. CULLIS HILL, Lower Plenty, Heidelberg. (Jersey.)

Completed since last report, 2. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Carnation	314 C.S.H.B.	23.2.18	273	lbs. 12½	lbs. 6,039	4.62	lbs. 278.87	lbs. 250	lbs. 318

A. W. JONES, "St. Albans," Geelong. (Jersey and Friesian.)

Completed since last report, 3. Certificated, 3.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Jersey—				lbs.	lbs.		lbs.	lbs.	lbs.
Bella of Colac.	4024	7.1.18	273	19	8,331	4.19	349.48	250	388
Silver Queen II. of Colac	4032	11.1.18	273	23½	7,373	6.42	486.44	250	554½
Friesian—									
Bolobek Rose	Not yet allotted	13.2.18	273	25	6,857	4.14	284.00	175	323½

C. G. LYON, Heidelberg. (Jersey.)

Completed since last report, 11. Certificated, 11.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
				lbs.	lbs.		lbs.	lbs.	lbs.
Melford Mascotte	5215	28.12.17	273	17	5,669	5.47	309.91	175	359½
Symphony	4281	19.1.18	273	18	5,622	6.09	339.21	250	387
Andrey Lassie	525	21.1.18	273	14½	6,919	4.71	325.55	250	371
Ettie V. of Banyule	5204	27.1.18	273	14½	4,780	5.14	245.89	175	280½
Statnette	4251	31.1.18	273	22	7,312	5.73	420.38	250	479½
Molly V. of Banyule	5216	6.2.18	273	6½	6,181	5.01	316.88	200	395
Silvermine XIV. of Banyule	5220	12.3.18	273	29	7,798	4.91	383.34	200	437
Molly II.	614	13.3.18	273	17	6,527	4.01	327.07	250	373
Lassie II.	1136	16.3.18	273	19½	7,309	4.85	354.87	250	404½
Silvermine XVI. of Banyule	5222	20.3.18	273	15	4,901	5.67	278.05	175	317
Noble Jessie	2843	26.3.18	273	18	6,832	5.29	361.48	250	412

J. MACKENZIE, Glenroy. (Jersey.)

Completed since last report, 2. Certificated, 2.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Princess of Kudaka	Not yet allotted	2.1.18	273	lbs. 7½	lbs. 3,404	5.34	181.64	lbs. 175	lbs. 207
Lady Perfection	"	4.1.18	273	11	3,413	6.50	221.78	200	252½

MEIER BROS., Box Hill. (Jersey.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Rosetta of Box Hill ..	5231	7.2.18	273	lbs. 13	lbs. 3,668	5.29	lbs. 194.11	lbs. 175	lbs. 221½

T. MESLEY, Dalyston. (Jersey.)

Completed since last report, 2. Certificated, 2.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Tilly Lantry, late Lily Shadow ..	5257 Not yet allotted	10.1.18 19.2.18	240 273	lbs. 4 10½	lbs. 4,911 4,620	5.26 5.79	lbs. 235.42 261.52	lbs. 175	lbs. 294½ 298½

MUHLEBACH BROS., Batesford. (Ayrshire.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Lily of Retreat ..	2961	17.1.18	207	lbs. 4	lbs. 5,112	4.69	lbs. 253.11	lbs. 290	lbs. 288½

MRS. L. ORCHARD, Grahamvale. (Jersey.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Pansy of Grahamvale ..	5330	8.1.18	273	lbs. 9	lbs. 4,334	5.25	lbs. 227	lbs. 175	lbs. 259½

W. PARBURY, Warburton. (Jersey.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Fuchsia 1X. of Melrose ..	381 C.S.J.H.B.	5.2.18	273	lbs. 18	lbs. 5,701	5.75	lbs. 327.78	lbs. 250	lbs. 373½

O. J. SYME, Macedon. (Friesian.)

Completed since last report, 3. Certificated, 3.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Duchess of Friesland Park	Not yet allotted	5.1.18	273	lbs. 122	lbs. 8,040	3.63	lbs. 291.53	lbs. 250	lbs. 332.4
Domino's Hergevelde B-46	"	13.1.18	273	21	8,151	3.81	310.83	200	354.4
Bolobek Jean	"	18.2.18	273	191	6,414	3.89	249.29	175	285

W. WOODMASON, Malvern. (Jersey.)

Completed since last report, 13. Certificated, 13.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Lassie Fowler V. of Melrose	5550	2.1.18	273	13	lbs. 4,670	5.99	273.92	250	319
Flower IX. of Melrose	5535	11.1.18	273	201	5,335	6.27	314.62	200	381.4
Quality VI. of Melrose	3674	17.1.18	273	204	9,401	4.99	469.31	250	335
Fuchsia X. of Melrose	4516	10.1.18	273	174	8,209	4.63	379.98	250	433.4
Handsome Girl VII. of Melrose	5541	21.1.18	273	18	6,339	6.78	490.80	250	491
Mystery XII. of Melrose	3667	22.1.18	273	204	6,871	5.57	383.09	250	430.4
Pearl V. of Melrose	5537	1.2.18	273	131	4,963	5.83	289.24	250	330
Jessie's Progress	3667	9.2.18	273	17	5,880	6.07	557.11	250	407
Lily VI. of Melrose	5532	11.2.18	265	142	5,110	7.05	360.01	200	410
Daisy V. of Melrose	3937	3.3.18	273	13	5,774	5.23	302.16	250	344.4
Mates V. of Melrose	4524	6.3.18	273	141	6,479	5.97	348.16	250	397
Flower VI. of Melrose	3841	8.3.18	273	15	7,948	5.55	439.23	250	500.4
Jessie XVI. of Melrose	5547	21.3.18	225	183	5,256	6.26	328.86	200	375

* Sold before completion of term.

RYAN AND HOWLEY, Axedale. (Ayrshire.)

Completed since last report, 1. Certificated, 1.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Lottie of Golden Vein	3979	20.2.18	273	18	lbs. 7,921	4.40	348.91	lbs. 250	lbs. 397.4

A. H. S. SCHIER, Caldermeade. (Ayrshire.)

Completed since last report, 2. Certificated, 2.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk last Day of Test.	Weight of Milk.	Average Test.	Butter Fat.	Standard required.	Estimated Weight of Butter.
Myrtle II. of Pine Grove	4637	16.3.18	273	lbs. 224	lbs. 6,546	4.30	lbs. 281.71	lbs. 175	lbs. 321.4
Countess II. of Pine Grove	4627	27.3.18	273	61	3,873	5.03	194.85	175	222

J. D. READ, Springhurst. (Jersey.)
Completed since last report, 8. Certificated, 8.

Name of Cow.	Herd Book No.	Date of Calving.	No. of Days in Test.	Weight of Milk at Day of Test.	Weight of Milk.	Average Yield.	Butter Fat.	Standard required.	Estimated Yield of Buttermilk.
				lbs.	lbs.		lbs.	lbs.	lbs.
Stock of Springhurst	5406	5.3.18	*239	11	3.983	5.34	212.51	175	242½
Nightsade of Springhurst	3707	7.3.18	273	20	7.935	5.34	425.37	250	485
Brighton Princess of Springhurst	5391	17.3.18	273	13½	5.325	5.51	293.18	175	334½
Pimpernel of Springhurst	5401	19.3.18	273	12½	5.653	5.11	290.79	175	331½
Avenone of Springhurst	5386	21.3.18	273	13	5.865	5.46	320.45	175	369½
Princess Royal of Springhurst	5403	21.3.18	273	13	5.086	5.79	294.38	175	335½
Columbine of Springhurst	5392	26.3.18	273	15½	5.106	6.37	325.51	175	371
Banksia of Springhurst	5387	27.3.18	273	14½	6.697	6.14	405.67	200	462½

* Dried off with mammites

In the field of agriculture we have agencies and instrumentalities, fortunately, such as no other Government in the world can show. The Department of Agriculture is undoubtedly the greatest practical and scientific agricultural organization in the world. Its total annual budget of \$46,000,000 has been increased during the last four years more than 72 per cent. It has a staff of 18,000, including a large number of highly trained experts, and alongside of it stand the unique land-grant colleges, which are without example elsewhere, and the 69 State and Federal experiment stations. These colleges and experiment stations have a total endowment of plant and equipment of \$172,000,000 and an income of more than \$35,000,000, with 10,271 teachers, a resident student body of 125,000, and a vast additional number receiving instruction at their homes. County agents, joint officers of the Department of Agriculture and of the colleges, are everywhere co-operating with the farmers and assisting them. The number of extension workers under the Smith-Lever Act and under the recent emergency legislation has grown to 5,500 men and women working regularly in the various communities, and taking to the farmer the latest scientific and practical information. Alongside these great public agencies stand the very effective voluntary organizations among the farmers themselves, which are more and more learning the best methods of co-operation and the best methods of putting to practical use the assistance derived from governmental sources. The banking legislation of the last two or three years has given the farmers access to the great lendable capital of the country, and it has become the duty both of the men in charge of the Federal reserve banking system and of the farm-loan banking system to see to it that the farmers obtain the credit, both short and long, to which they are entitled not only, but which it is imperatively necessary should be extended to them, if the present tasks of the country are to be adequately performed. Both by direct purchase of nitrates and by the establishment of plants to produce nitrates, the Government is doing its utmost to assist in the problem of fertilization. The Department of Agriculture and other agencies are actively assisting the farmers to locate, safeguard, and secure at cost an adequate supply of sound seed.—*From President Wilson's Message to the Farmers' Conference at Urbana, Ill., 31st January, 1918.*

THE AUSTRALIAN FLORA FROM AN ORNAMENTAL ASPECT.

(Continued from page 187.)

Edward E. Pescott, F.L.S., F.R.H.S., Government Pomologist.

Gum Trees—continued.

Now that the use of eucalyptus foliage, or "gum leaves" as they are familiarly called, has become so universal for in-door decoration purposes, it is well to mention certain species, of which *cosmophylla* is one, which have handsome and decorative foliage. As is well known, eucalypts have, at different stages, two types of foliage. The foliage of the young plant in the seedling and "sucker" stage is known as juvenile foliage, and it is usually far more decorative in appearance than the mature or adult foliage. Very often, the juvenile foliage is broad and roundish, while the adult foliage is narrow and long. The broad, round leaves are the more sought after, particularly when they bear that mealy vestiture which gives them a silvery-grey appearance. Some eucalypts retain this silvery-grey or glaucous appearance even on the adult foliage. Such a species is *Eucalyptus tetragona*, the mealy gum, which is really a tall shrub, growing to slightly over 20 feet. So far back as 1827, this species was grown in England as a conservatory pot plant, under the name of *Eudesmia tetragona*. The broad leaves, and the stems, too, are very mealy in appearance, due to the whitish waxy bloom with which they are covered. The white flowers, too, are very beautiful. It is also known as *Eucalytus pleurocarpa*.

Eucalyptus cordata, the white peppermint, as well as *Eucalyptus pulverulenta*, the silver leaf stringy bark, also possesses this mealliness of foliage and stems, and the roundish leaves, which are usually in pairs, opposite to each other, are very decorative. Such a type of foliage is in appearance like the juvenile foliage of some species. The following species, *Gunnii*, the Cider gum; *populifolia*, the poplar leaf gum; *gamophylla*, the joined leaf gum; *polyanthemus*, the red box; and others, all have this type of foliage. The apple gum, *Eucalyptus Stuartiana*, too, has it in its juvenile stage of growth. The young foliage of the blue gum, *Eucalyptus globulus*, is also very decorative on account of this characteristic, and for the first three or four years the young tree is very decorative in any shrubbery. Later on the tree is very straggly, and quite unornamental. On account of the beauty of its juvenile foliage, this species is largely grown as a conservatory pot plant in the northern hemisphere.

Eucalyptus alpina, the Grampians gum, a species found only in the Grampians, in Victoria, has a fine shrubby habit, with rich, glossy, green leaves, and good white flowers. This has been successfully grown as a fine lawn specimen.

For decorative trees in large gardens, *Eucalyptus maculata*, the spotted gum, may take pride of place. It is one of our most shapely gums, with very good glossy foliage, having a wonderfully blotched and mottled bark. About the end of the year, the old bark flakes off in irregular patches, disclosing colourations of brown, cream, and pure white. This characteristic of blotched and mottled bark is also noticeable in the valuable timber tree, the river red gum, *Eucalyptus rostrata*. This is one of the most ornamental of gums, and is to be found in almost all parts of the Commonwealth.

Many of the gums have clear white or bluish-white bark, which makes them stand out in a very striking manner among dark foliage. Such is the lemon-scented gum, *Eucalyptus citriodora*, whose leaves, when bruised, emit a delicious lemon-citron odour. It is a poor specimen tree, but, in association with dark and closer-foliaged trees, it is very handsome.



Mahogany Gum—*Eucalyptus botryoides*.

Similarly, *Eucalyptus saligna*, the willow leaf gum, a more shapely tree, stands out well in the tree garden. *Eucalyptus cinerea*, the silver stringy bark, too, with its whitish-brown trunk, and glaucous decorative foliage, is a fine shapely tree, and one of the most magnificent of gums. *Eucalyptus viminalis*, the Manna gum, and *Eucalyptus rubida*, the candle bark gum, also appear as finely white-barked gums.

In some of the glens in the Mount Lofty Range, in South Australia, and at Healesville and Gippsland, in Victoria, groups of these "White" gums create a magnificent picture in the forest scenery.

Among the dwarf gums possessing the decorative bark, the Snow gum, *Eucalyptus coriacea* (*pauciflora*), is, perhaps, the finest. A native of the snow-topped mountains, yet it grows well in the lower and warmer situations in the State. The group illustrated shows its dwarf character, for the trees are over thirty years old.



Snow Gums - *Eucalyptus coriacea*.

One of the fastest-growing of gums is the Mahogany Gum, of Gippsland, *Eucalyptus botryoides*. It is a decorative tree, and has been known to grow at the rate of a foot a month for twelve months in a very happy situation. The tree illustrated, which looks like a forest veteran, is about twenty-eight years old. *Eucalyptus radiata*, the river white gum, is another decorative type, having a fine drooping habit. The

Kurri, *Eucalyptus diversicolor*, and the Jarrah, *Eucalyptus marginata*. Thrive well in cultivation, as also does that fine tree, the Brisbane Stringybark, *Eucalyptus siderophloia*. Another very ornamental tree is the Bloodwood, *Eucalyptus corymbosa*. Indeed, it may be said that any of the eucalypts will succeed as a cultivated plant.

The gum tree most popularly grown, especially for shade, is *Eucalyptus corynocalyx* (*cladocalyx*), the Sugar Gum. It is a quick grower, and apt to grow tall, leaving the lower growths unfurnished. In Horsham, Victoria, there are magnificent avenues of sugar gums



Blossom of Brisbane Stringybark—*Eucalyptus siderophloia*.

planted as street trees. The sugar gum has very brittle wood, and the long sprawling limbs often snap off under stress of a wind storm. It is also subject to the boring larvæ of certain beetles and moths.

Eucalypts may all be trimmed or pruned into shape. Indeed, many of the quick-growing ones, like the sugar gum, may be cut hard back to the trunk, leaving only the bare stem standing. The pruning should be done in early spring, so that the subsequent tender growths will not be injured or burned by frost.

(To be continued.)

AN ECONOMIC PLANT.

THE JERUSALEM ARTICHOKE.

By J. W. Audas, F.L.S., F.R.M.S., Assistant, National Herbarium, Melbourne.

The Jerusalem artichoke (*Helianthus tuberosus*), a plant of the natural order Compositæ, is a native of North America. It is a hardy perennial herb with rod-like stems 6 to 8 feet in height, and many subcordate petioled leaves and clustered tuberous roots. There are several varieties, which are distinguished by the colour of the tubers—red, white, and yellow—and by the shape of the leaves, which are either narrow or broad. The tubers (rhizomes) are used as a vegetable principally during the winter, sometimes as a dish, but more generally for flavouring purposes. They are considered both wholesome and nutritious, and may be given to invalids when abstinence from other vegetable food is necessary. Before the potato became plentiful they were widely used in Europe, and they are still in great demand there for flavouring soups.

Jerusalem artichokes or topinambour are extensively cultivated in France for distilling purposes (as are potatoes and beet roots), yielding as much as 7 to 9 per cent of absolute alcohol. According to Payen, the average analysis of the tubers of Jerusalem artichokes is as follows:—

Water	..	..	..	76.04
Glucose and crystallizable sugar	..	..	14.70	
1. Inulin	..	..	1.86	
Cellulose	..	..	1.50	
Pectic acid and pectin	..	..	1.29	
Albumine and N. matters	..	..	3.12	
Fatty matters	..	..	0.20	
2. Mineral salts	..	..	1.29	
			—	23.96
				100.00

1. Inulin belongs to the amyloid group of the carbo-hydrates, and occurs in the roots of some plants, among which may be mentioned, in addition to the Jerusalem artichoke, the dahlia. Inulin is intermediate between gums and starch, and yields fermentescible sugar by prolonged boiling with dilute acid.

2. Of the mineral salts, more than one-fifth is potash.

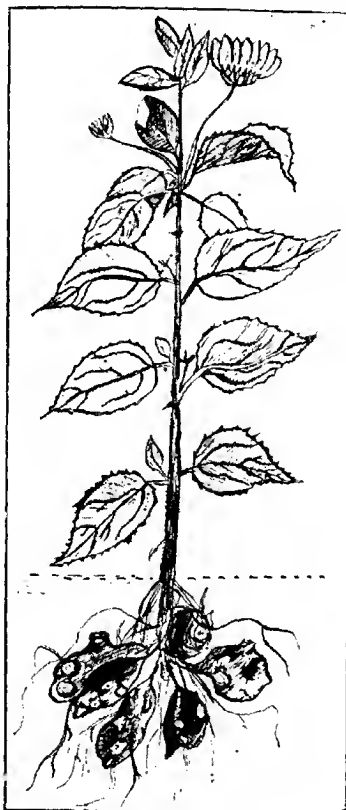
The composition of these tubers varies very much, according to the time they are dug up. The percentage of crystalline sugar is largest during the cold season, while, during the summer, starch—like inulin, gummy matters, and glucose—prevails. The tubers form very late, and should not be dug before the stems fade off, viz. in the autumn.

CULTIVATION.

The plant will succeed on a variety of soils, but generally gives the best results when grown on rich sandy loams. To insure the most successful results, trench over a piece of ground in the autumn and give a light dressing of nitrogenous and potassic manures, fork over in September, and then plant good-shaped tubers in rows about 3 feet

apart, allowing from 18 inches to 2 feet between the tubers in the lines. About 4 bushels will plant an acre. Artichokes may, with considerable advantage, be grown in rotation with maize.

When the plants are well above the soil they will keep in check any ordinary farm weeds, and very little cultivation will be required. Ten to twelve tons of tubers are considered an average crop. More



Jerusalem Artichoke—*Helianthus tuberosus*, L.

attention is now being paid to the cultivation of Jerusalem artichokes, as they are known to be good pig feed, and they are usually harvested by turning the animals into the field. The tubers will keep in the ground all the winter, and usually enough of them are left by the pigs to produce a new crop. An important element in their value for the feeding of swine is their availability during the entire winter and spring and the fact that their harvesting costs nothing. Though

artichokes are but little affected by frost, they do not stand storing in pits and silos, like beet root and potatoes.

This plant has of late years grown into favour as a marketable crop, and the demand seems to be increasing. Considering its very easy culture, it is fairly remunerative.

The following are the peculiar advantages of the Jerusalem artichoke over other fodder plants capable of being grown in this State:-

(1) It does not require to be planted every year; (2) it will yield more to the acre than potatoes; (3) it does not require harvesting; (4) it stands frost well; (5) it increases the yield of dairycows to an extraordinary degree, and improves the quality of the milk; (6) it is one of the cheapest and healthiest pig foods raised, and is also an excellent food for cattle, sheep, and horses; and, finally, (7) it is highly important, because no insect, blight, or rust attacks it.

NEXT SEASON'S WHEAT CROP.

Commonwealth Government's Guarantee.

In announcing that the Commonwealth Government was willing to continue the Wheat Pool and guarantee 1s. 4d. per bushel for the 1919-20 harvest, the Acting Prime Minister (Mr. Watt) made the following statement:—

"Conflicting views have recently been placed before the Government in regard to the control of the wheat industry. The Federal Farmers' Organization has urged the continuance of the pool under conditions practically identical with those already arranged, the only variation of moment recommended being in regard to the constitution of the State Boards and the method of appointment by certain States of representatives upon the Central Board. On the other hand, representations have been made by traders that the purchase and sale of wheat by merchants and traders should be permitted at the end of the present season. The Government was also asked for a definite declaration of policy in respect to the general resumption of trade under normal conditions.

"No other trade presents such difficulties to an early restoration of pre-war conditions as the wheat business. The Government is not anxious to prolong indefinitely its responsibility, either of management or finance of wheat. It wishes to get out of the business as soon as it can do so safely. A general survey, however, shows that this cannot be done until the shipping and marketing positions become clearer. If we allow for loss through wastage, and for inferiority for sales already made to the British Government and other buyers, for anticipated further overseas sales and local consumption during the year, we have an exportable surplus of about 2,500,000 tons of f.a.q. wheat to dispose of.

"The Prime Minister has been authorized to offer 2,000,000 tons to the British Wheat Commission at 5s. per bushel. To this no definite reply has yet been received, but recent indications do not inspire great hope. An announcement by the British Food Controller made it appear as though 500,000 tons of wheat belonging to the British Wheat Commission in Australia would still be unshipped on 31st August, 1919.

According to later news, the Imperial Government is doubtful if the whole of its purchase will be lifted by the end of 1919. The position then will be, assuming that no sale is made to the Imperial Government, that by the end of the year we may expect to have 2,500,000 tons of f.a.q. wheat and considerable holdings of inferior wheat, with a new crop of, perhaps, 2,500,000 tons coming in. In these circumstances the resumption of normal trading would be impossible. Merchants could not make purchases on advances against the new harvest on a scale satisfactory to growers.

"As custodians of large quantities of wheat purchased by the Imperial Government, and having regard to our responsibilities to taxpayers and wheat growers, we should see that there is a systematic realization of our stocks. To reduce deterioration to a minimum, we should see that the oldest wheat is shipped first. We should not only eliminate competition to sell our wheat, but we should also avoid that competition for tonnage which would be so disastrous and result in such increased freight charges if indulged in by the Imperial Government, the Australian Wheat Board, and the merchants.

"This competition cannot be eliminated, and this systematic realization cannot be effected, unless the pooling scheme is continued for another year.

QUESTION OF GUARANTEES.

"The Federal Farmers' Organization has also asked for a guaranteed return from the 1919-20 harvest, and in this request has the support of the Victorian Chamber of Agriculture and of the Royal Agricultural Society of Victoria. In view of the present financial outlook, this question of guarantee is of vital concern to the taxpayer, whose interests are apt to be ignored. Demands are made that we should emulate the example of America, and give such a guarantee as will practically compel heavy contributions from revenue. It should not be overlooked that the purpose of the American guarantee was to insure an ample supply of foodstuffs to the Allies. Now that the shipping position has eased, America must face her losses, and it is not at all unlikely that her guarantee will result in a deficiency of hundreds of millions of pounds. The policy of the American Government will exert a powerful influence on overseas markets. If weather conditions prove favorable, she may have a yield of 1,200,000,000 bushels. If acute competition arises with other producing countries we may see a period of low prices. This may not be an unmixed evil for the Australian wheat grower, as it would mean a diminished area under crop the following year in America. But it would be a serious matter for the Australian taxpayer, whose credit had been pledged to afford encouragement to the wheat grower.

"The Government, however, is prepared, provided the States are willing to co-operate, to offer a guarantee for the coming year of 4s. 4d. per bushel, less freight from point of delivery to the port of export. To some growers, this guarantee may be disappointing, but to the enlightened majority it will prove acceptable. The Wheat Board's indebtedness is now over £20,000,000, and though the overdraft appears to have reached its apex its rapid diminution cannot be expected. If our wheat is unsold for twelve months, our interest bill will amount to

nearly 3d. per bushel, and, in addition, charges for upkeep and deterioration are inevitable. This is usually overlooked by those who suggest that the most profitable way to realize is to postpone the realization indefinitely.

"It is the intention of the Commonwealth Government to consult the States immediately to ascertain if they will fall in with the proposals for the continuance of the pooling system and of the guarantee. We have every reason to believe the States will accept these proposals, and so assure wheat growers, if not of a highly remunerative, yet of a profitable, return from their labours."

STALLION PARADES.

TIME TABLE, 1919.

(Subject to slight alteration if necessary.)

Date.	Place.	Time.	Officer Arrives.	Officer Departs.
Every Saturday:— June 21 to Dec. 27 ..	Agricultural Offices	10 a.m. to 12 noon		
July 21 to July 23 ..	Royal Show Grounds	10 a.m.		
WIMMERA No. 1.				
Monday, July 7 ..	Ararat ..	3 p.m. ..	1.27 p.m. ..	9.37 p.m.
Tuesday, July 8 ..	Goroke ..	3 p.m. ..	2 p.m. ..	6 p.m.
Wednesday, July 9 ..	Horsham ..	9 a.m. ..	9.25 p.m. (8th) ..	12.5 p.m. (10th)
Thursday, July 10 ..	Stawell ..	3 p.m. ..	2.41 p.m. ..	8.10 p.m.
WESTERN No. 1.				
Tuesday, July 15 ..	Coleraine ..	10 a.m. ..	7.35 p.m. (14th)	Driving
Tuesday, July 15 ..	Casterton ..	3 p.m. ..	Driving ..	8.30 a.m. (16th)
Wednesday, July 16 ..	Portland ..	1.5 p.m. ..	1.5 p.m. ..	2.55 p.m.
Thursday, July 17 ..	Hamilton ..	11 a.m. ..	6.8 p.m. (16th) ..	Driving
Thursday, July 17 ..	Balmoral ..	3 p.m. ..	Driving ..	Driving
CENTRAL No. 1.				
Wednesday, July 23 ..	Inglewood ..	2 p.m. ..	1.30 p.m. ..	4.25 p.m.
Thursday, July 24 ..	Bendigo ..	11 a.m. ..	6 p.m. (23rd) ..	3.15 p.m.
MALLEE No. 1.				
Wednesday, July 30 ..	Birchip ..	11 a.m. ..	8.20 p.m. (29th)	1.37 p.m.
Wednesday, July 30 ..	Watchem ..	3 p.m. ..	2.4 p.m. ..	4 a.m. (31st)
Thursday, July 31 ..	Donald ..	11 a.m. ..	5.15 a.m. ..	12.25 p.m.
Thursday, July 31 ..	St. Arnaud ..	3 p.m. ..	1.50 p.m. ..	7.11 a.m. (1st Aug.)
MALLEE No. 2.				
Tuesday, July 29 ..	Mildura ..	3 p.m. ..	7.10 a.m. (29th)	8 a.m. (30th)
Wednesday, July 30 ..	Ouyen ..	3 p.m. ..	10.28 a.m. ..	9.45 p.m.

STALLION PARADES, TIME TABLE—*continued.*

Date.	Place.	Time.	Officer Arrives.	Officer Departs.
NORTH-EASTERN No. 1.				
Monday, July 28 ..	Tangamah	3 p.m. ..	1.21 p.m. ..	9.31 p.m.
Tuesday, July 29 ..	Yarrawonga	3 p.m. ..	10.5 p.m. (28th)	7.20 a.m. (30th)
Wednesday, July 30 ..	Rutherglen	3 p.m. ..	1.53 p.m. ..	7.50 a.m. (31st)
Thursday, July 31 ..	Myrtleford ..	3 p.m. ..	2.59 p.m. ..	7.12 a.m. (1st Aug.)
Friday, August 1 ..	Benalla ..	11 a.m. ..	10.17 a.m. ..	5.40 p.m.
WIMMERA No. 2.				
Tuesday, August 5 ..	Hopetoun ..	3 p.m. ..	9.55 p.m. (4th)	7 a.m. (6th)
Wednesday, August 6 ..	Warracknabeal	3 p.m. ..	9.50 a.m. (5th)	7.50 p.m.
Thursday, August 7 ..	Boulah ..	10 a.m. ..	9.15 p.m. (6th)	11.55 a.m.
Thursday, August 7 ..	Minyip ..	3.30 p.m. ..	3.18 p.m. ..	11.43 a.m. (8th)
Friday, August 8 ..	Murtoa ..	2 p.m. ..	12.30 p.m. ..	3.32 p.m.
MALLEE No. 2.				
Tuesday, August 5 ..	Swan Hill ..	3 p.m. ..	6.25 p.m. (4th)	10.50 a.m. (6th)
Wednesday, August 6 ..	Kerang ..	3 p.m. ..	12.29 p.m. ..	6 a.m. (7th)
Thursday, August 7 ..	Pyramid ..	11 a.m. ..	7.10 a.m. ..	2.26 p.m.
WIMMERA No. 3.				
Monday, August 11 ..	Beaufort ..	2 p.m. ..	12.27 p.m. ..	8.35 p.m.
Tuesday, August 12 ..	Kaniva ..	2 p.m. ..	2.28 a.m. ..	12.42 a.m. (13th)
Wednesday, August 13 ..	Nhill ..	3 p.m. ..	1.22 a.m. ..	1.32 a.m. (14th)
Thursday, August 14 ..	Rainbow ..	12 noon ..	11.40 a.m. ..	2.50 p.m.
Friday, August 14 ..	Jeparit ..	4 p.m. ..	4 p.m. ..	5 p.m. (driving)
Friday, August 15 ..	Dimboola ..	11 a.m. ..	Driving (14th)	2.18 p.m.
GOULBURN VALLEY No. 1.				
Monday, August 11 ..	Heathcote ..	2 p.m. ..	11.41 a.m. ..	6.27 p.m.
Tuesday, August 12 ..	Kyabram ..	2 p.m. ..	12.52 p.m. ..	4.25 p.m.
Wednesday, August 13 ..	Tatura ..	10 a.m. ..	5.41 p.m. (12th)	11.44 a.m.
Wednesday, August 13 ..	Echuca ..	2.30 p.m. ..	2.5 p.m. ..	3.45 p.m.
Wednesday, August 13 ..	Rochester ..	4.30 p.m. ..	4.25 p.m. ..	9.3 a.m. (14th)
Thursday, August 14 ..	Elmore ..	11 a.m. ..	9.40 a.m. ..	1.40 p.m.
Friday, August 15 ..	Cohuna ..	11 a.m. ..	5.10 p.m. (14th)	12.30 p.m.
MALLEE No. 3.				
Tuesday, August 19 ..	Quambatook	10 a.m. ..	6.33 p.m. (18th)	11.31 a.m.
Tuesday, August 19 ..	Boort ..	12.55 p.m. ..	12.55 p.m. ..	1.35 p.m.
Wednesday, August 20 ..	Charlton ..	2 p.m. ..	4.7 p.m. (19th)	4.27 p.m.
Thursday, August 21 ..	Sea Lake ..	3 p.m. ..	9.25 p.m. (20th)	8.20 a.m. (22nd)
Friday, August 22 ..	Wycheproof	11.50 a.m. ..	11.40 a.m. ..	12.30 p.m.

STALLION PARADES, TIME TABLE—continued.

Date	Place	Time	Officer Arrives.	Officer Starts.
NORTH-EASTERN				
No. 2.				
Monday, August 18 ..	Tallangatta	4.40 p.m.	4.38 p.m. ..	5 a.m. (19th)
Tuesday, August 19 ..	Corryong ..	3.30 p.m.	3.30 p.m. ..	7 a.m. (20th)
Thursday, August 21 ..	Wangaratta	2 p.m. ..	9.34 a.m. ..	4.37 p.m.
Friday, August 22 ..	Euroa ..	10 a.m. ..	6.33 p.m. (21st)	11.12 a.m.
Friday, August 22 ..	Seymour ..	2 p.m. ..	12.11 a.m. ..	8.15 p.m.
GOULBURN VALLEY No. 2.				
Monday, August 25 ..	Dookie ..	2 p.m. ..	12.40 p.m. ..	4.10 p.m.
Tuesday, August 26 ..	Cobram ..	2 p.m. ..	1.57 p.m. ..	8.10 p.m.
Wednesday, August 27 ..	Nunurkah ..	11 a.m. ..	4.38 p.m. (26th)	12.45 p.m.
Wednesday, August 27 ..	Nathalia ..	2 p.m. ..	1.37 p.m. ..	3.26 p.m.
Thursday, August 28 ..	Shepparton ..	2 p.m. ..	5.40 p.m. (27th)	6 p.m.
Friday, August 29 ..	Murchison ..	11 a.m. ..	7.15 p.m. (28th)	7.3 p.m.
CENTRAL No. 2.				
Monday, August 25 ..	Mansfield ..	2 p.m. ..	2 p.m. ..	3.30 p.m.
Tuesday, August 26 ..	Yea ..	9.30 a.m. ..	6.33 p.m. (25th)	10.33 a.m.
Tuesday, August 26 ..	Alexandra ..	2 p.m. ..	12.25 p.m. ..	4.40 p.m.
Wednesday, August 27 ..	Kilmore ..	10 a.m. ..	10 p.m. (26th) ..	9.45 p.m.
Thursday, August 28 ..	Ballan ..	10 a.m. ..	10 a.m. ..	12.2 p.m.
Thursday, August 28 ..	Melton ..	2 p.m. ..	1.31 p.m. ..	5.13 p.m.
Friday, August 29 ..	Bacchus Marsh	11 a.m. ..	5.31 p.m. (28th)	12.59 p.m.
Saturday, August 30 ..	Werribee ..	12 noon ..	11.47 a.m. ..	1.16 p.m.
WESTERN DISTRICT No. 1.				
Monday, Sept. 1 ..	Colac ..	3 p.m. ..	10.41 a.m. ..	8.30 p.m.
Tuesday, Sept. 2 ..	Camperdown ..	11 a.m. ..	9.36 p.m. (1st) ..	12.14 p.m.
Tuesday, Sept. 2 ..	Terang ..	3 p.m. ..	12.44 p.m. ..	10.27 p.m.
Wednesday, Sept. 3 ..	Warrnambool ..	11 a.m. ..	11.32 p.m. (2nd) ..	2.17 p.m.
Wednesday, Sept. 3 ..	Koroit ..	3 p.m. ..	2.45 p.m. ..	12.22 a.m. (4th)
Thursday, Sept. 4 ..	Port Fairy ..	11 a.m. ..	12.52 a.m. ..	1.27 p.m.
Thursday, Sept. 4 ..	Penshurst ..	4 p.m. ..	Driving ..	7.47 a.m. (5th)
CENTRAL No. 3.				
Monday, Sept. 1 ..	Castlemaine ..	10 a.m. ..	9.30 a.m. ..	12.25 p.m.
Monday, Sept. 1 ..	Kyneton ..	1.30 p.m. ..	1.11 p.m. ..	3.12 p.m.
Tuesday, Sept. 2 ..	Maryborough ..	11 a.m. ..	5.58 p.m. (1st) ..	12.55 p.m.
Tuesday, Sept. 2 ..	Clunes ..	2 p.m. ..	1.43 p.m. ..	7.36 p.m.
Wednesday, Sept. 3 ..	Smeaton ..	2 p.m. ..	Driving ..	Driving
Thursday, Sept. 4 ..	Daylesford ..	2 p.m. ..	7.17 p.m. (3rd) ..	3.25 p.m.
Friday, Sept. 5 ..	Ballarat ..	2 p.m. ..	6.36 p.m. (4th) ..	7.10 p.m.
GIPPSLAND No. 1.				
Monday, Sept. 8 ..	Bonyip ..	10 a.m. ..	9.56 a.m. ..	6.31 p.m.
Tuesday, Sept. 9 ..	Morwell ..	10 a.m. ..	8.49 p.m. (8th) ..	11.57 a.m.
Tuesday, Sept. 9 ..	Traralgon ..	3 p.m. ..	12.20 p.m. ..	9.15 p.m.
Wednesday, Sept. 10 ..	Sale ..	2 p.m. ..	10.20 p.m. (9th) ..	4.11 p.m.
Thursday, Sept. 11 ..	Trafalgar ..	11 a.m. ..	6.51 p.m. (10th) ..	2.8 p.m.
Thursday, Sept. 11 ..	Warragul ..	3 p.m. ..	2.50 p.m. ..	7.50 p.m.
Friday, Sept. 12 ..	Dandenong ..	11 a.m. ..	9.32 p.m. (11th) ..	1.38 p.m.

STALLION PARADES, TIME TABLE—*continued*.

Date.	Place.	Time.	Officer Arrives.	Officer Departs.
GIPPSLAND No. 2.				
Tuesday, Sept. 9 ..	Lang Lang ..	11 a.m. ..	8.59 a.m. ..	7.17 p.m.
Wednesday, Sept. 10 ..	Yarram ..	3.30 p.m. ..	3.30 p.m. ..	4.30 a.m. (11th)
Thursday, Sept. 11 ..	Foster ..	11 a.m. ..	5.59 a.m. ..	2.21 p.m.
Friday, Sept. 12 ..	Dalyston ..	11 a.m. ..	9.4 p.m. (11th) ..	3.43 p.m.
GIPPSLAND No. 3.				
Monday, Sept. 15 ..	Romsey ..	11 a.m. ..	10.41 a.m. ..	5.25 p.m.
Wednesday, Sept. 17 ..	Orbost ..	2 p.m. ..	8.45 p.m. (16th)	6.40 a.m. (18th)
Thursday, Sept. 18 ..	Bairnsdale ..	12 noon ..	11.25 a.m. ..	2.25 p.m.
Friday, Sept. 19 ..	Lilydale ..	3 p.m. ..	1.45 p.m. ..	5.35 p.m.
SPECIALS.				
Tuesday, Sept. 16 ..	Omeo ..	3.30 p.m. ..	2.30 p.m. ..	6.30 a.m. (17th)
Friday, Sept. 19 ..	Mernda ..	12.30 p.m. ..	12.24 a.m. ..	1.15 p.m.
Saturday, Sept. 20 ..	Royal Show ..	1.30 p.m. ..		
Monday, Sept. 22 ..	.. ..	9 a.m. ..		
Thursday, October 2 ..	Leongatha ..	2 p.m. ..	10.59 a.m. ..	4.7 p.m.
Friday, October 3 ..	Korumburra ..	11 a.m. ..	4.45 p.m. (2nd)	5.5 p.m.

CORRECTION.

SOUTH GIPPSLAND JERSEYS.

In the *Journal of Agriculture* for February, in an account of Mr. S. Rowe's Jersey herd, it was stated that a two-year-old bull out of Larkspur's Claribelle "won wherever shown last year." Later information, however, demands a correction of that statement.

Mr. D. C. Miller, of Agnes, who is also a breeder of Jersey cattle, has pointed out that a bull bred by him won the first and championship prize at the Leongatha Show last year, on which occasion Mr. Rowe's bull was placed second.

It would appear that a fine competitive spirit exists in regard to Show honours in the Jersey classes in South Gippsland, as these two bulls have met in competition on four occasions. Three times Mr. Rowe's bull was placed first, and once the judge preferred Mr. Miller's.

If only the same spirit of emulation obtained throughout the State in regard to annual butter-fat production as exists in the case of Show ring honours, there would be a big future for breeders of Jersey stock. This breed is able to hold its own with any other in dairy work, and it is every breeder's duty to himself, as well as to the breed he is handling, to demonstrate its worth to the public through the medium of the Government Herd Test Competition.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

As soon as the fruit is off the trees, the land should be well ploughed and left in a rough condition until the spring ploughing. If not already done, and the orchard conditions demand it, there is still time to put in a leguminous crop for green manuring purposes. But this should be done as early as possible, so as to give the crop a chance to make some good early growth. Soils deficient in lime or in organic matter are always benefited by a crop of green manures. Where stable manure is unobtainable, the green manure crop is the only means of adding organic matter to the soil.

PESTS AND DISEASES.

All second-hand and old cases should be thoroughly overhauled. It is preferable to do this work now, instead of leaving it till spring, when the rush of other duties will certainly prevent it being carried out. The cases, if not bad enough to be destroyed by fire, should be dipped for some time in boiling water. And this is not only for the killing of the codlin larvæ, but also to destroy larvæ or eggs of any scale or aphid, and also any spores of fungus diseases that may have found lodgment therein.

As soon as the trees have shed their foliage they may be sprayed with red oil emulsion for woolly aphid, peach aphid, and the bryobia mite. And this should be done before pruning, so that in handling and carrying the prunings the pests will not be spread about the orchard to infect the clean portions.

PREMATURE FLOWERING OF FRUIT TREES.

As a result of the extremes of seasons we have just experienced, many fruit trees are now flowering in different parts of the State. The long continued hot dry weather of the end of last year and the beginning of this year caused the fruit buds to harden and mature. In addition the trees lost quite a large amount of foliage. Then the rains and cool weather suddenly came, causing what might be termed a "false spring." As a result the trees were given an impetus, they pushed out their buds; and the flowers developed very freely. Plums were commonly in flower last month; and many cases of apples, pears, and cherries were noticed.

Where this has occurred, the fruit should not be allowed to set; it should be picked off at once, without damaging the fruit spurs or buds. If allowed to grow on, it would be of no value, as it could not ripen. But the worse result would be a continued weakening of the trees, which would unsettle them for the subsequent bearing. In any case, it has rarely been found that the trees which so prematurely flowered bore a good crop in the next season.

Flower Garden.

Bulbs, tubers, and corms of spring-flowering plants should now all be planted. As they appear above ground, they should be protected from the ravages of snails and slugs, as these pests have a very great

liking for these succulent growths. A good surface dressing of broken leaf or dust tobacco will effectually deal with these pests. In fact, the gardener who constantly uses tobacco, either in the leaf, stem, or dust forms, will very soon be in the happy position that slugs and snails will cause him no anxiety whatever. Besides, the tobacco has manurial properties which are also valuable.

Pansy and any other seedlings, also rooted layers and cuttings, may now be planted out into their permanent positions.

Sowings may also be made of any hardy annuals, such as antirrhinum, aquilegia, correopsis, Canterbury bell, dianthus, everlastings, foxglove, gaillardia, hollyhock, larkspur, leptosyne, lobelia, marigold, pansy, petunia, stock, sweet peas, verbena, wallflower, &c.

Vegetable Garden.

There should now be no untidy or undug beds in the kitchen garden. The vacant beds should all be well dug over and prepared for the planting of vegetables for use in spring. In digging, a top dressing of manure should be given; this may be dug in. All weeds, too, may be forked into the trenches, and covered well with soil as each spit or length is dug. A dressing of lime is very beneficial at this time of the year three or four weeks after the manure or weed dressing.

A start should now be made at cleaning out the asparagus beds. This vegetable is most popular, and yet one rarely met with in ordinary household gardens. It is supposed to be difficult to grow, but this supposition is not borne out, as, once established, a bed of asparagus is one of the most easily managed plots in the whole garden. Depth of good soil and plenty of manure are all that this plant requires.

In establishing a new bed, it is advisable to see that there is a good depth of 2 or 3 feet of rich, well-manured soil. If this is not present, the soil should be dug out to that depth, and thoroughly mixed and enriched with well-rotted manure before being replaced. A bed deeply prepared, and supplied with ample quantities of manure, should last without replanting for very many years. The young plants or crowns should then be planted in trenches, keeping the rows 2 or 3 feet apart. An asparagus bed requires ample and direct exposure to the full rays of the sun. The asparagus should not be cut during the first season after planting; in fact, it is better to allow it to go uncut for two seasons. As little foreign weed growth as possible should be allowed in the beds, but, when they are not producing culinary asparagus, rows of lettuce, beans, radish, &c., may be grown between the crowns.

Towards the end of April the tops may be cut down, the beds cleaned, and a good top dressing of stable manure given. Chemical fertilizers, such as bonedust, sulphate of ammonia, and sulphate of potash, may be given as a substitute to organic manure. In the past it has been the custom to annually top-dress the beds with salt. It was supposed that, as asparagus in its native habitat was usually found in sandy soils near the sea coast, the plant required salt or a saline soil to produce successful results. It has latterly been found that salt is not at all essential to good growth, and that the plant will readily adapt itself and grow well in soils of not at all a saline character. Where potash has taken the place of salt, quite improved results followed.

REMINDERS FOR MAY.**Live Stock.**

HORSES.—Those stabled can be fed liberally. Those doing fast or heavy work should be clipped; if not wholly, then trace high. Those not rugged on coming into the stable at night should be wiped down and in half an hour's time rugged or covered with bags until the coat is dry. Old horses and weaned foals should be given crushed oats. Grass-fed working horses should be given hay or straw, if there is no old grass, to counteract the purging effects of the young growth. Attend to teeth and feet of horses to be turned out for the winter.

CATTLE.—Cows, if not housed, should be rugged. Rugs should be removed in the daytime when the shade temperature reaches 60 degrees. Give a ration of hay or straw, whole or chaffed, to counteract the purging effects of young grass. Cows about to calve, if over fat, should be put into a paddock in which the feed is not too abundant. Calves should be kept in warm dry shed. Observe strict cleanliness in feeding to avoid losses and sickness incidental to calf-rearing.

PIGS.—As recommended in Reminders for April.

SHEEP.—Keep in-lamb ewes in strong condition. Best lambing results are obtained when ewes are neither too poor, nor excessively fat. Once the lambs arrive then the most liberal treatment possible is in the main the most profitable. Ill-fed ewes are bad mothers, indifferent to the new-born lamb, and rearing them badly afterwards, particularly very young or very old ewes. Select fine weather for lamb-marking. Yard lambs over night. Never castrate or tail high-conditioned lambs immediately on being run in and overheated. The risk with large lambs will be lessened if they are allowed to stay in the yards an hour or two after castration and the coagulated blood drawn, which in many cases will be found retained in the groin and purse, no matter what method of opening the purse is used. In tailing never draw tails tight. Projecting bone delays healing, especially when cutting off with hot blades. Even with the knife leave enough loose skin to come over and cover the vein and check the usual strong rush of blood from lambs on well-fed mothers.

POULTRY.—Feed animal food to forward pullets, about $\frac{1}{2}$ oz. daily, and equal parts heavy oats and broken maize at night. Add lucerne chaff to mash daily. See that fowl houses are free from draughts to avoid colds, also that they are free from red mites. Use Epsom salts freely to avoid Roup and Chicken Pox.

Cultivation.

FARM.—Dig main crop potatoes. Push on with ploughing and sowing of cereal crops, including peas and beans. Green fodder (as for April) may still be sown. Land for maize, potatoes, and other root crops should be prepared and manured. Flax may be sown. Transplant Chou Moellier and Giant Drumhead cabbage plants in rows 3 feet apart. Complete sowing permanent pastures with grasses and clovers.

ORCHARD.—Plough, manure; apply lime to orchard lands at rate of 5 or 10 cwt. per acre where soil is sour. Spray trees infested with scale insects, Woolly Aphis, and Bryobia Mite with red oil or crude petroleum. Clean all rough bark from trees. Commence pruning early varieties at end of month.

FLOWER GARDEN.—Digging, manuring, and pruning; trench and drain where necessary. Dress the surface with lime. Continue to sow hardy annuals. Bury all leaves, soft-wood cuttings, and weeds. Continue to plant spring blooming perennials and other plants. Plant cuttings of carnations and roses.

VEGETABLE GARDEN.—Cut down and clean out asparagus beds. Apply manure and lime dressings. Cultivate deeply. Plant out seedlings and early potatoes; sow peas, broad beans, carrots, and parsnips.

VINEYARD.—Subsoil land for new plantations if not already done. This work should be carried out as long before planting as is practicable. Vine growers are warned against the too common practice of feeding off foliage after vintage. Any small advantage in the form of stock feed is only gained at the cost of a reduction in the following season's crop, owing to interference with accumulation of reserves, which continues so long as the leaves remain green. Sheep should not be allowed into the vineyard until all leaves have changed colour. Early and deep ploughing is strongly recommended. Manures should be applied as early as possible. Peas, &c., for green manuring, should be sown without delay, in order to take advantage of early rains.

Cellars.—Rack or fill up (preferably the former) dry wines as soon as a lighted match, introduced at bung hole, is no longer extinguished. Sweet wines should also be racked and fortified to full strength.